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Penner et al.

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(54) **SOUND ATTENTUATOR**

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Related U.S. Application Data

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(60) Provisional application No. 60/895,152, filed on Mar. 16, 2007.

(51) **Int. Cl.**
E04F 17/04 (2006.01)

(52) **U.S. Cl.** **181/224**; 181/225; 454/338

(58) **Field of Classification Search** 181/224, 181/225; 454/338
See application file for complete search history.

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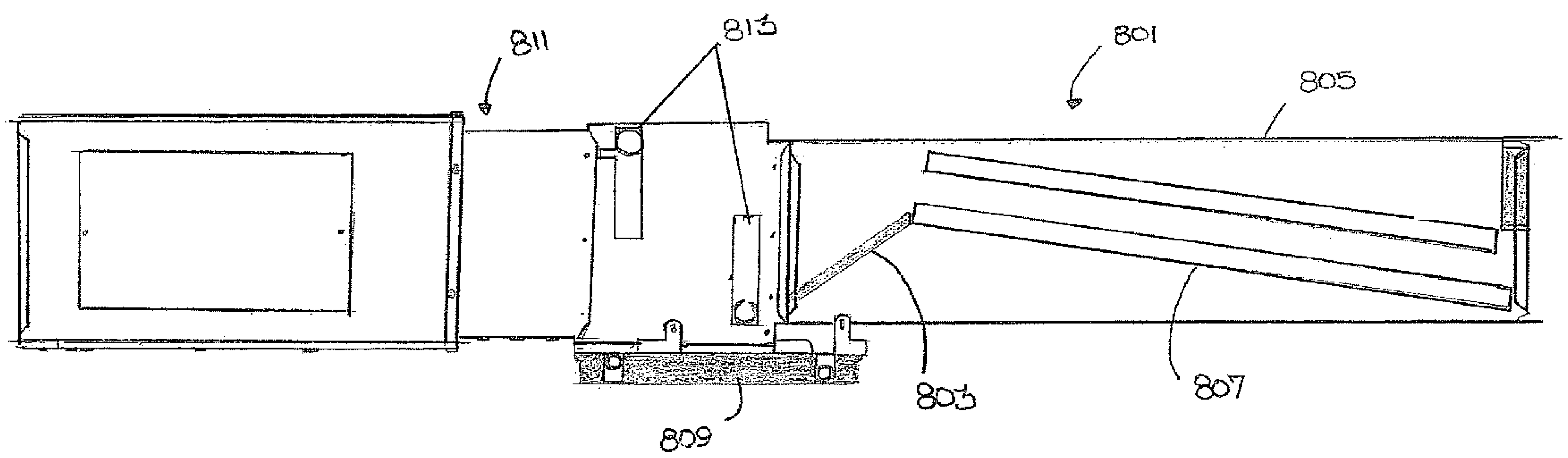
(57) **ABSTRACT**

An apparatus and method for attenuating the sound generated by a fan powered terminal unit or other equipment in an HVAC (heating, ventilating, and air conditioning) system is described. The apparatus utilizes internal geometry to minimize noise due to air disturbances and aerodynamic effects within the apparatus. Specifically, a silencer is described comprising a casing having an inlet and an outlet; a condensate deflector positioned at the inlet to the casing; at least one baffle being operable to attenuate noise in a gas flowing through the silencer; and an air pathway through the silencer, defined by positions of the condensate deflector and the at least one baffle within the casing. The air pathway is angled or curved to substantially minimize the line-of-sight pathway from the inlet to the outlet.

20 Claims, 11 Drawing Sheets



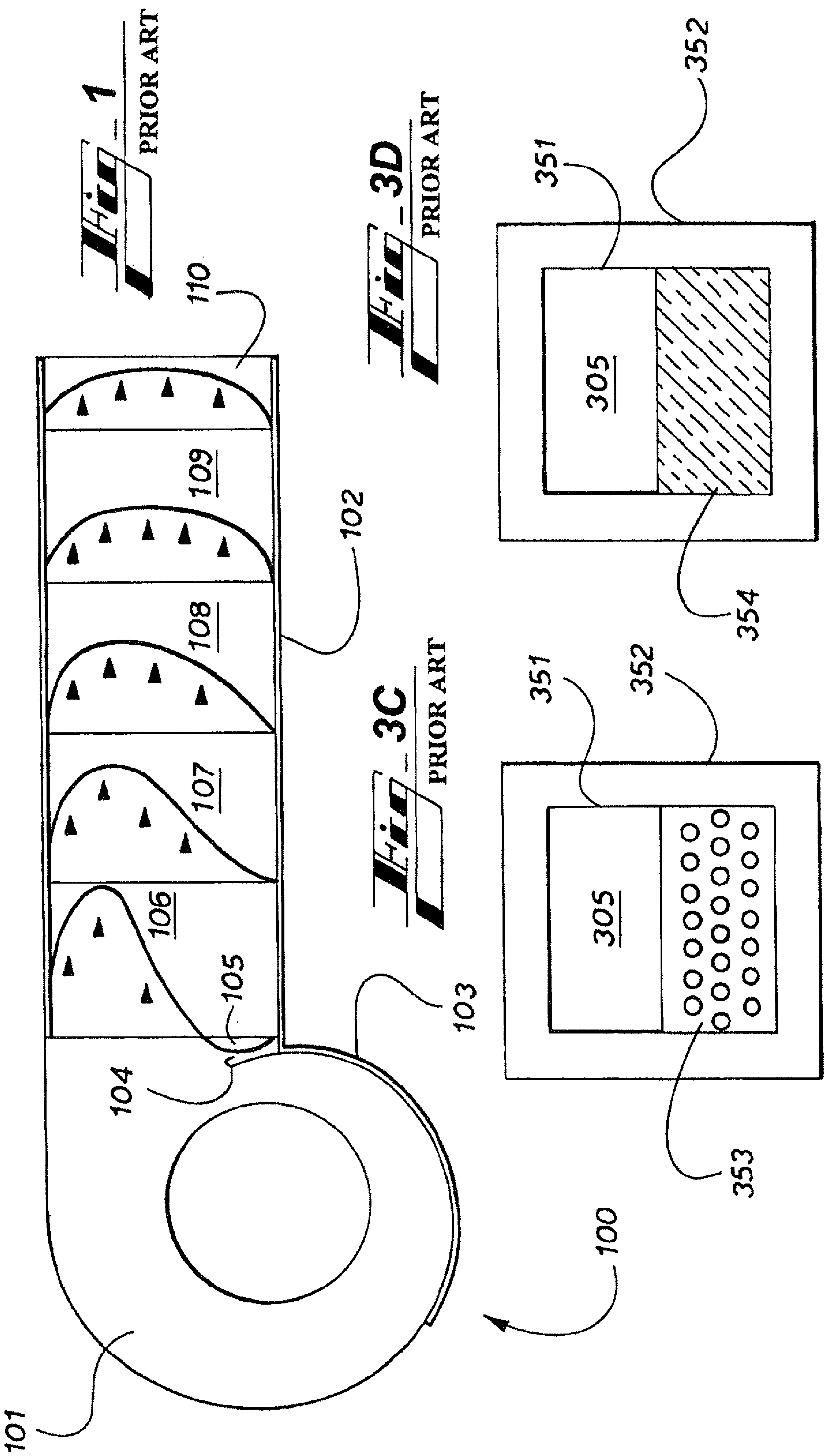


Fig. 1
PRIOR ART
110
109
108
107
106
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Fig. 3D
PRIOR ART
351
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Fig. 3C
PRIOR ART
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353

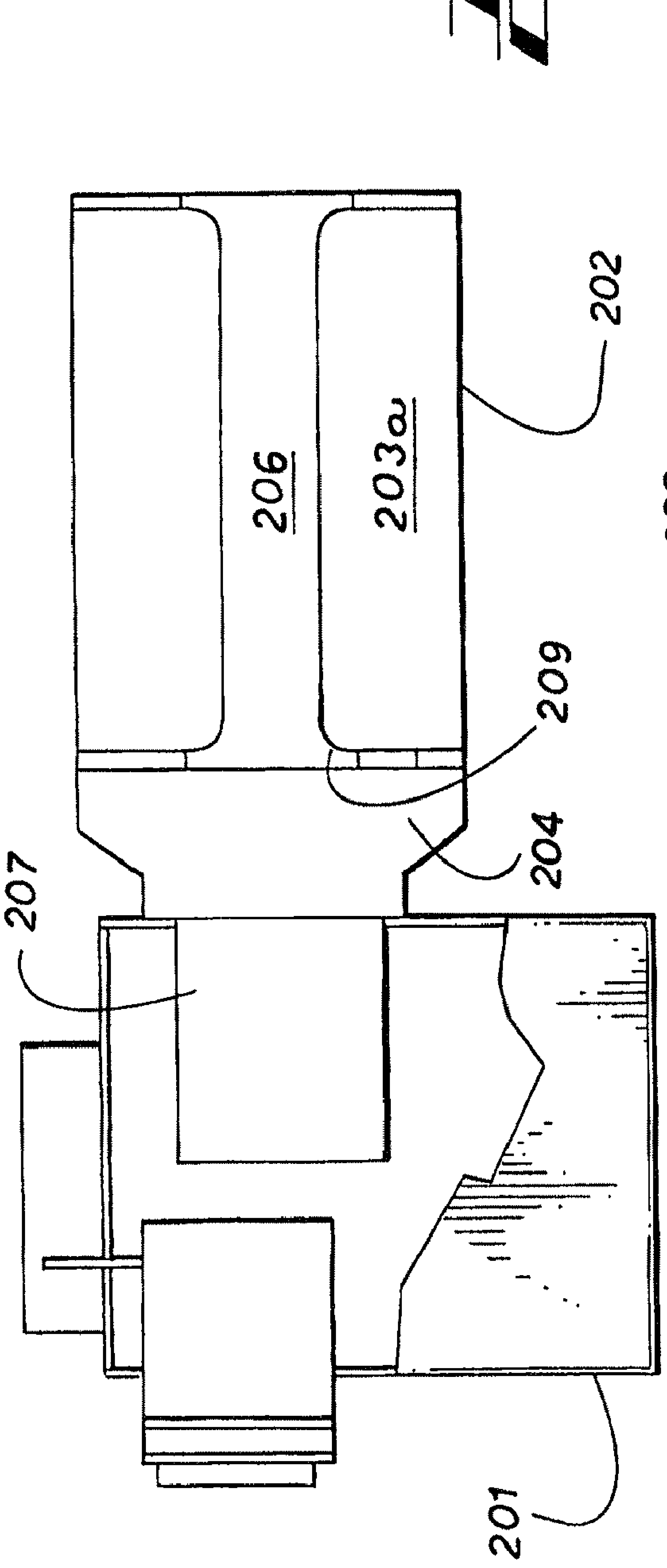

Fig. 2A PRIOR ART

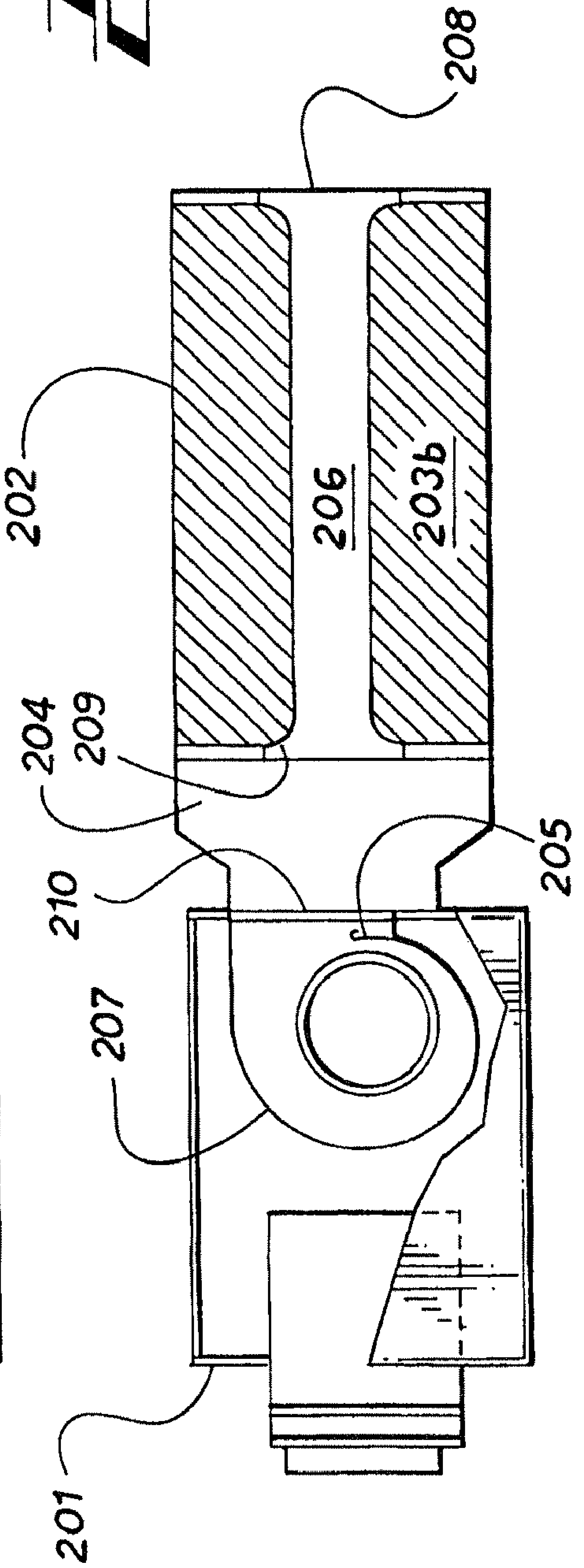

Fig. 2B PRIOR ART

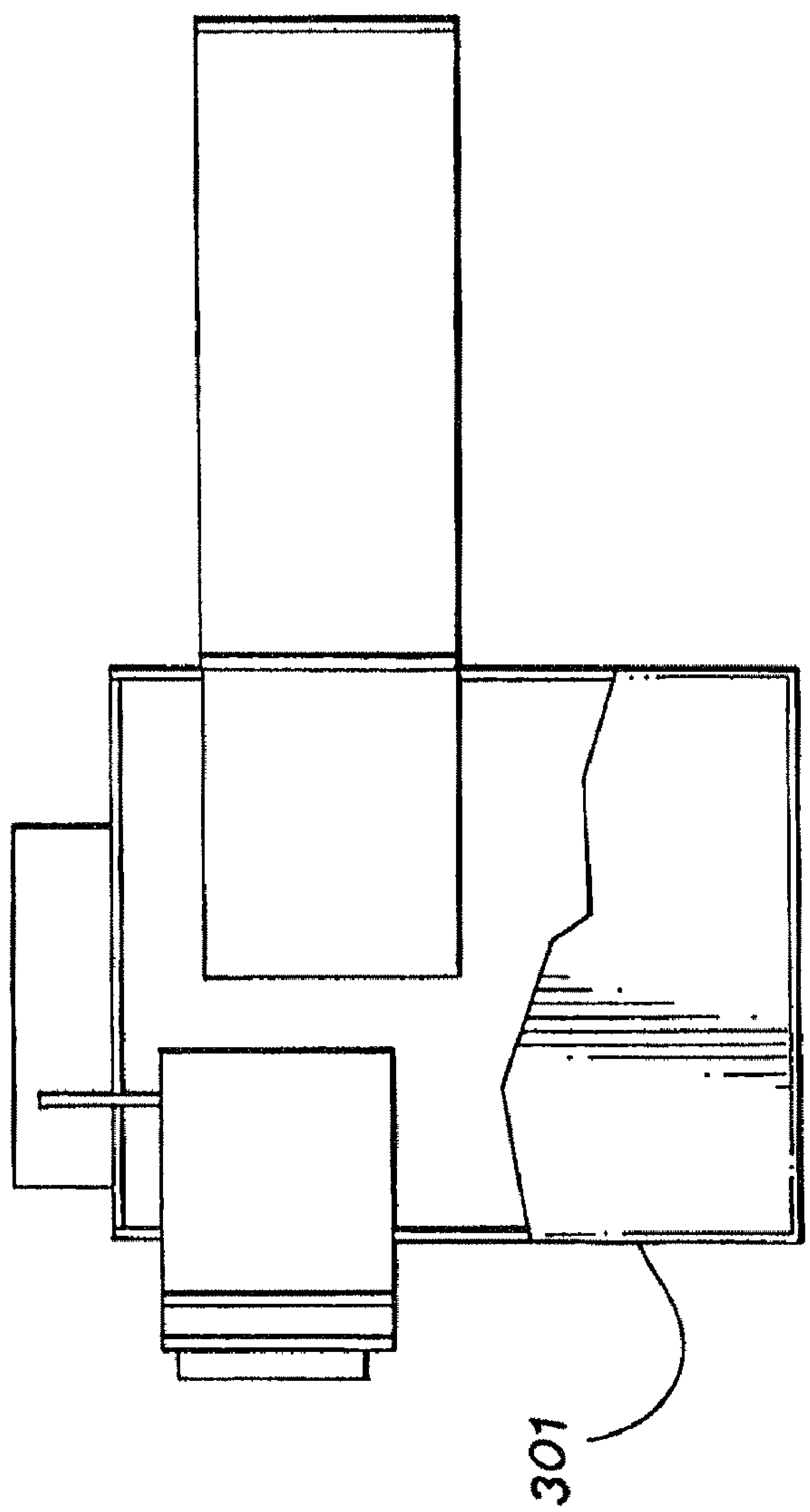

FIG. 3A PRIOR ART

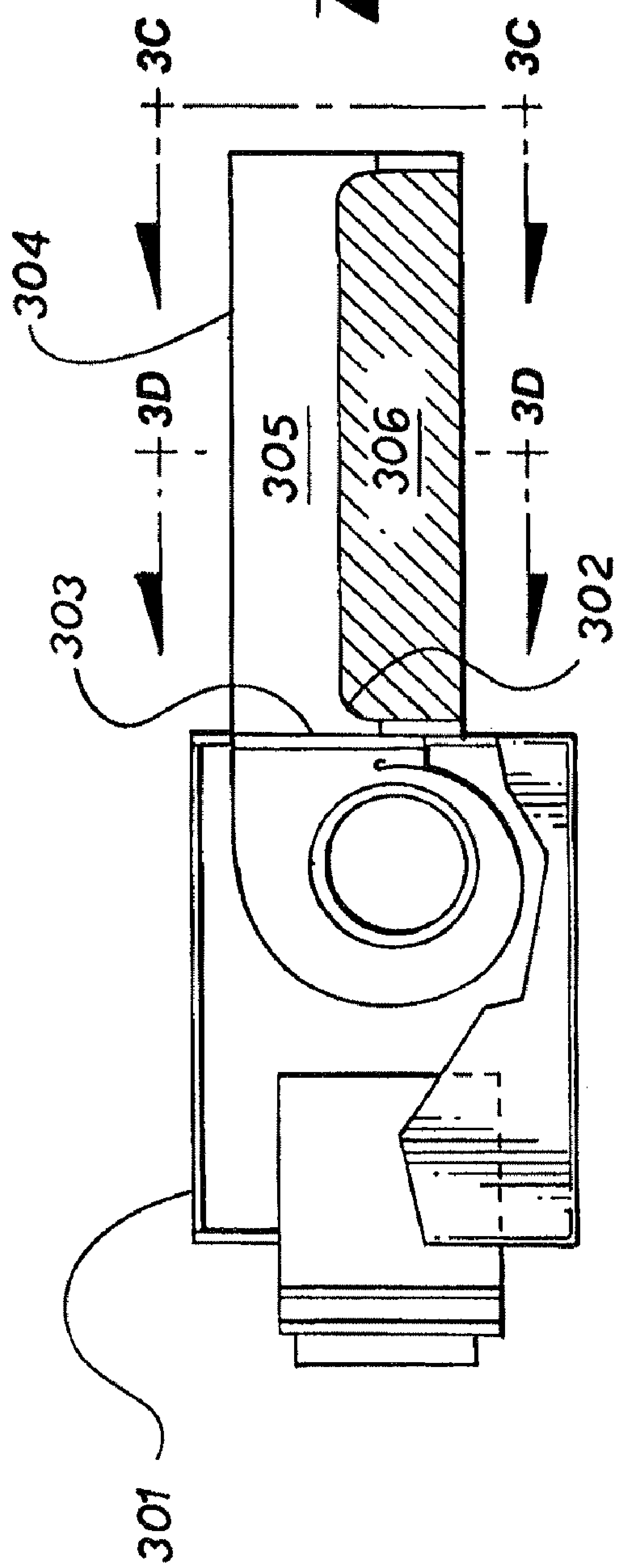

FIG. 3B PRIOR ART

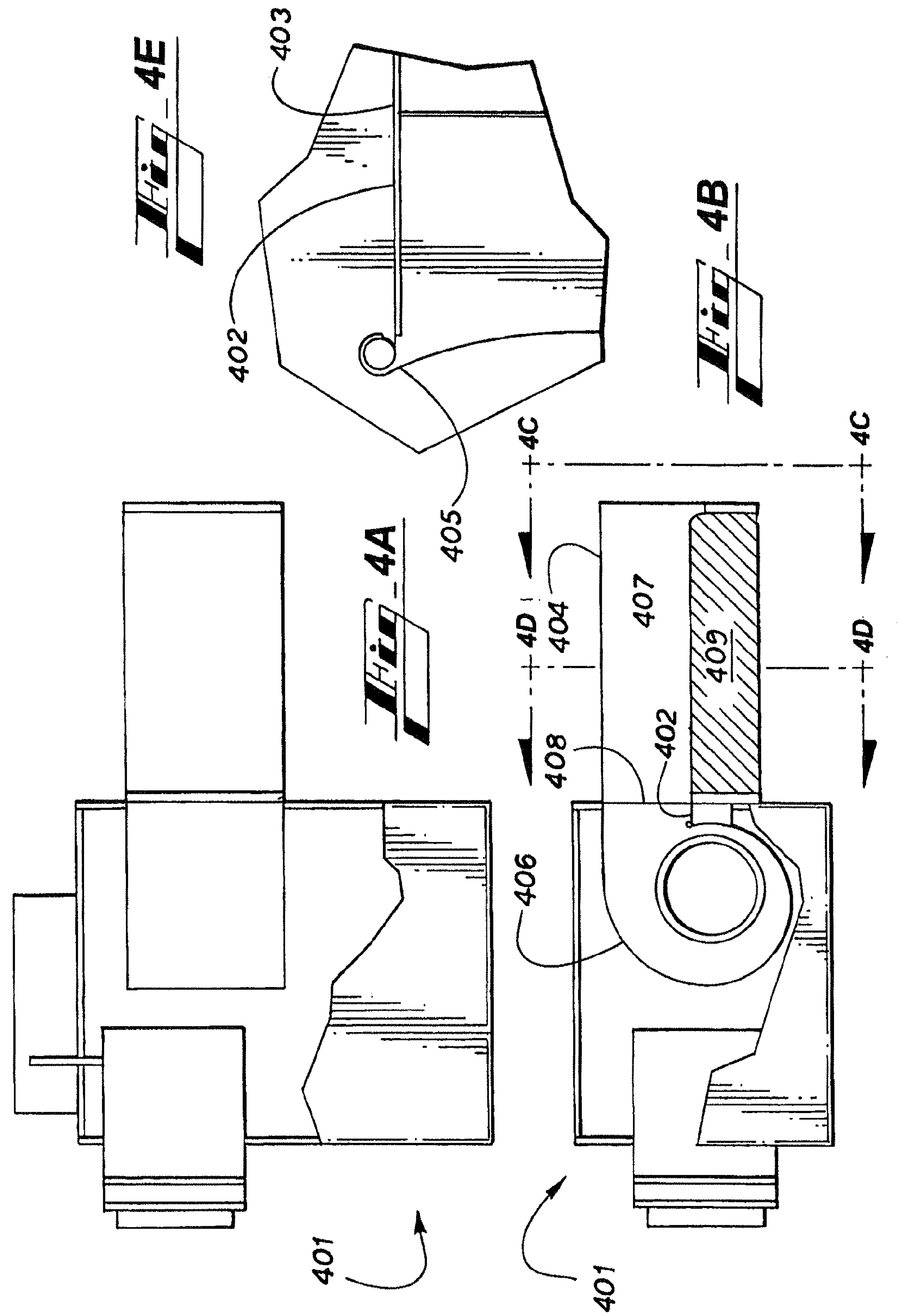

Fig_4E
403
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Fig_4A
Fig_4B
4C
4C
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4D
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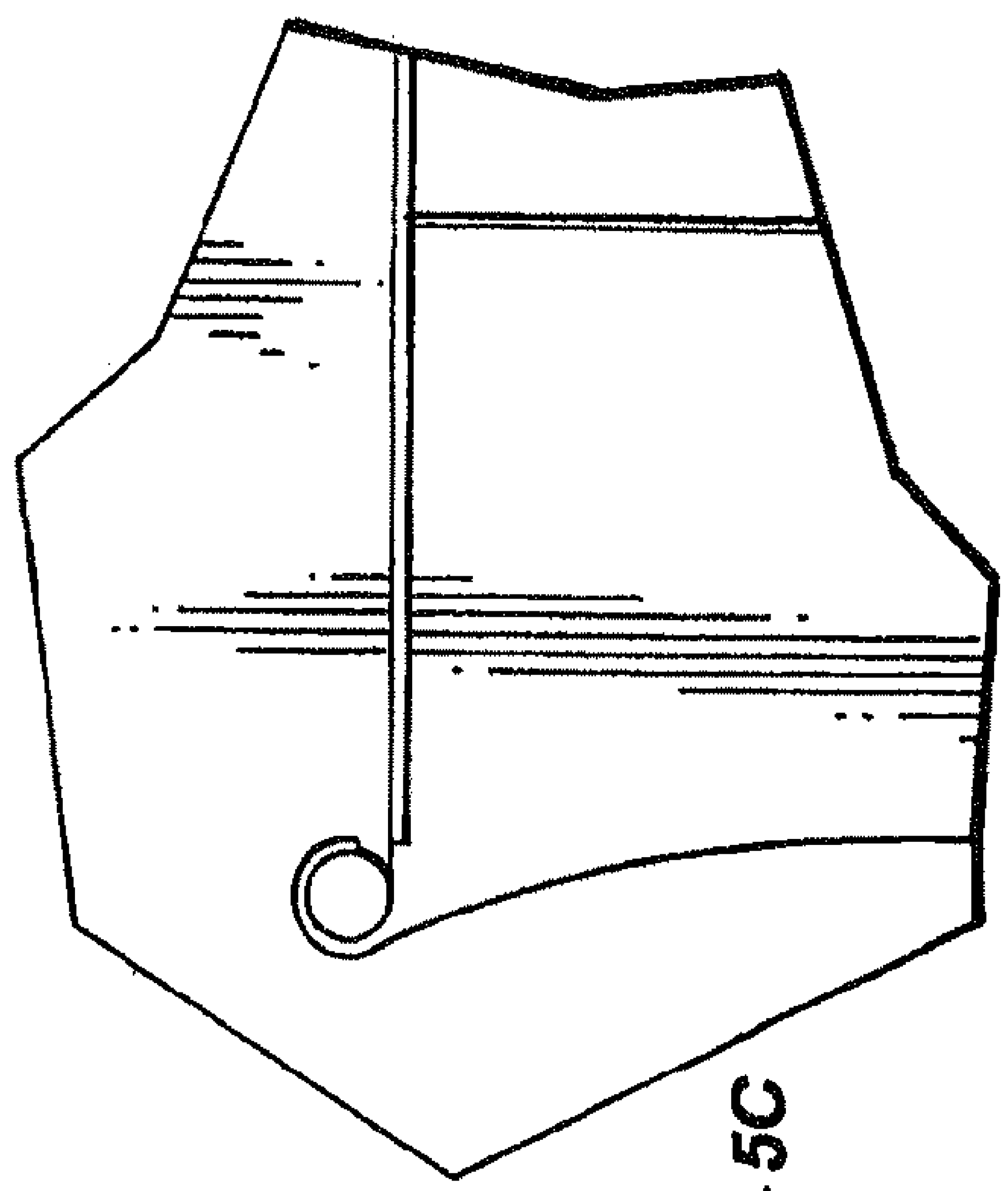

FIG. 5E

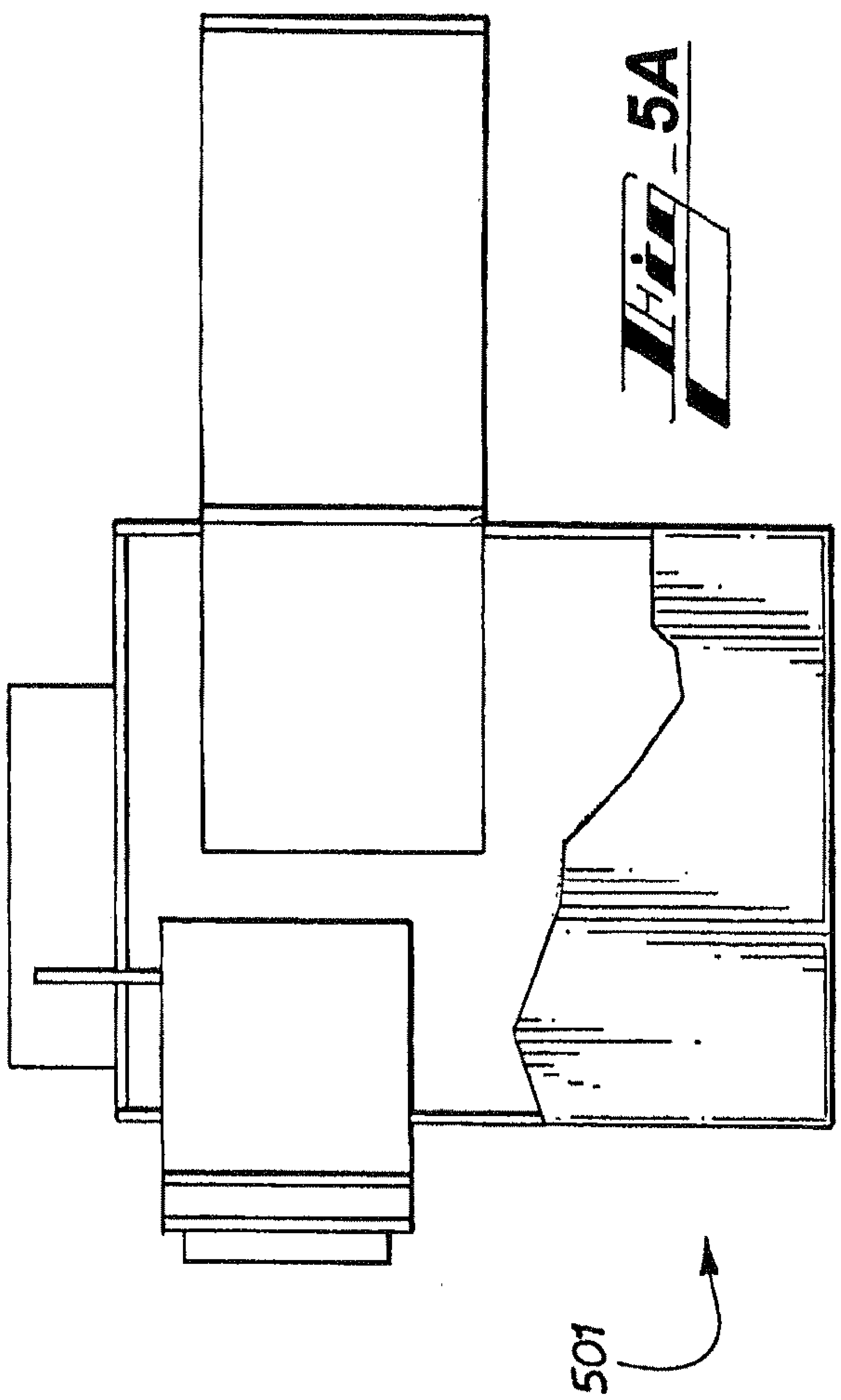

FIG. 5A

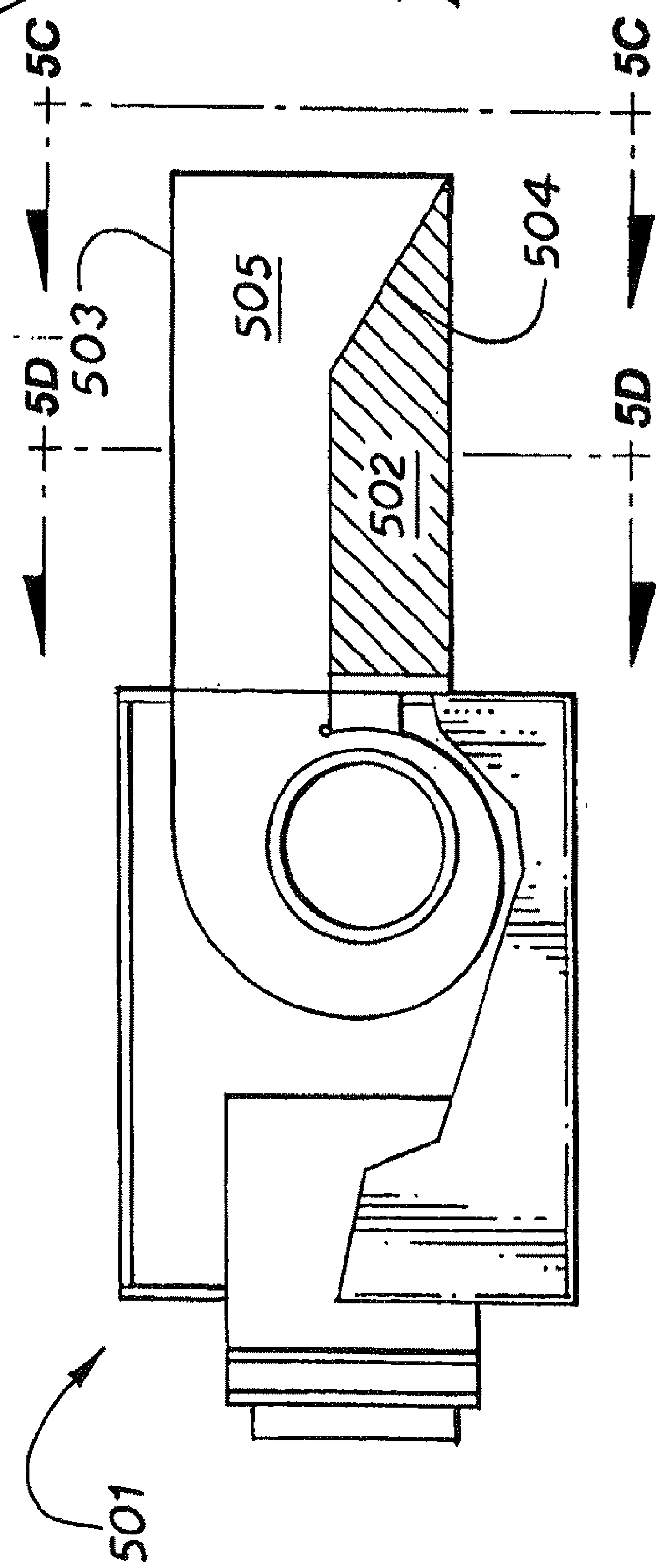

FIG. 5B

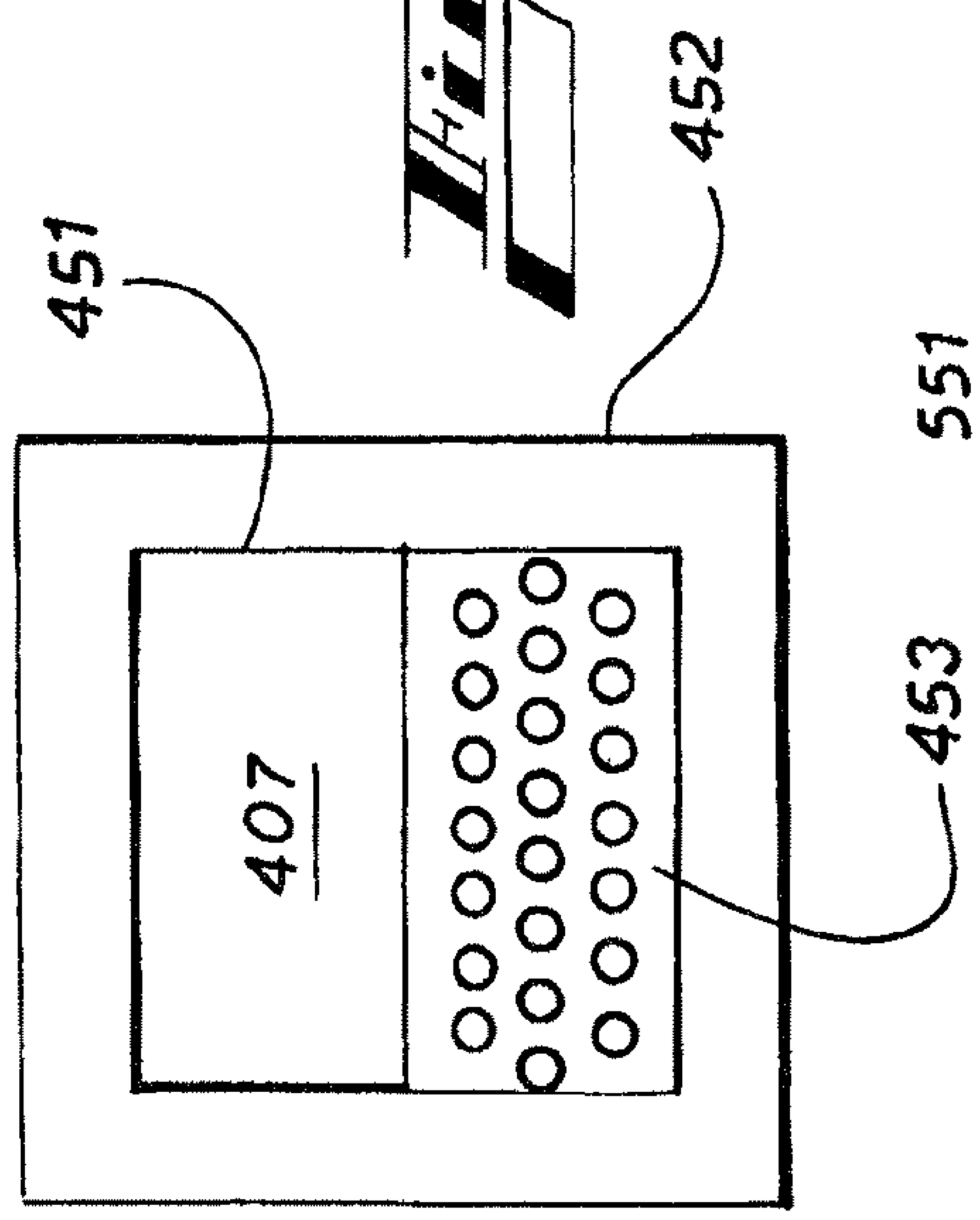

FIG. 4C

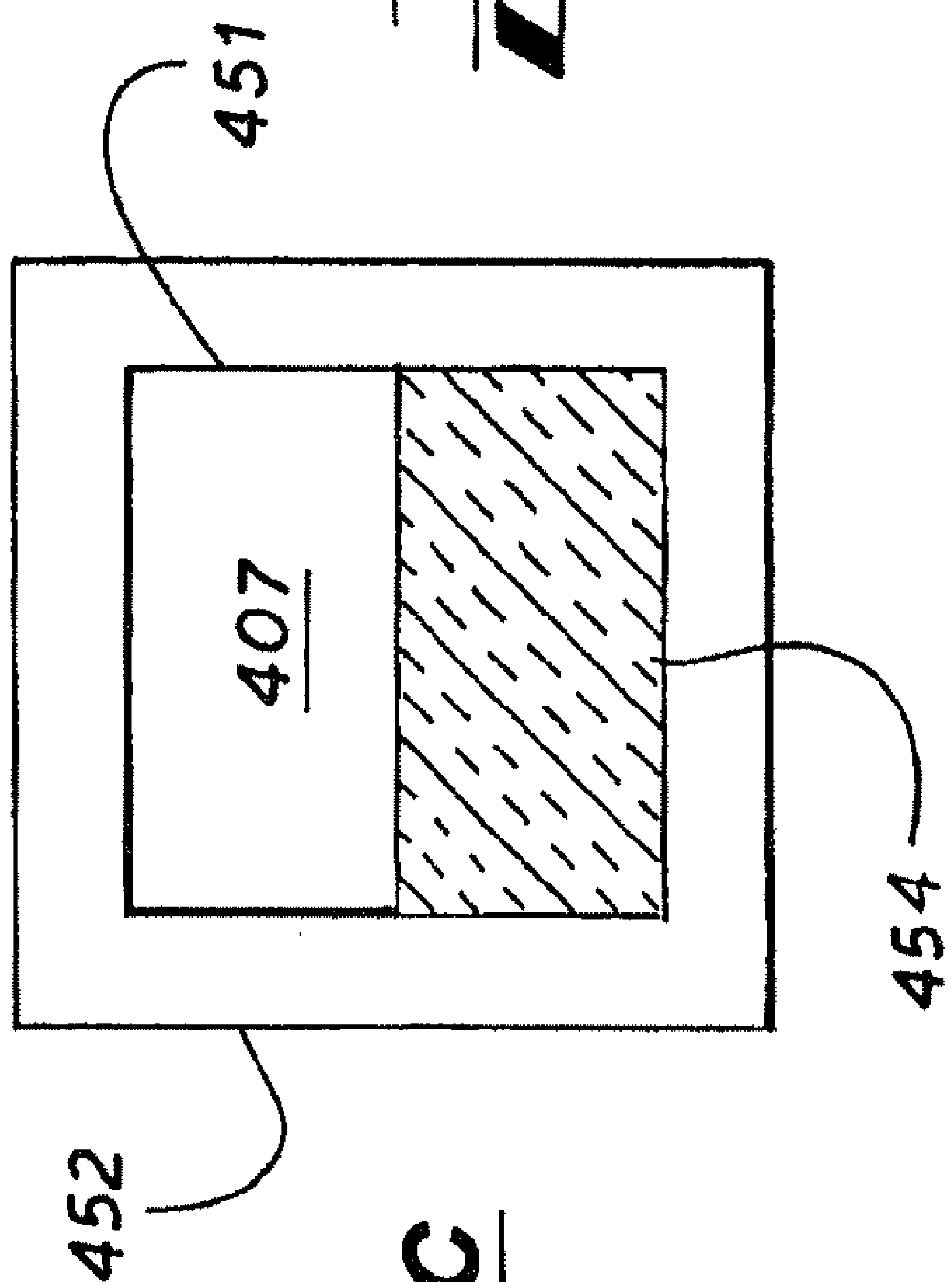

FIG. 4D

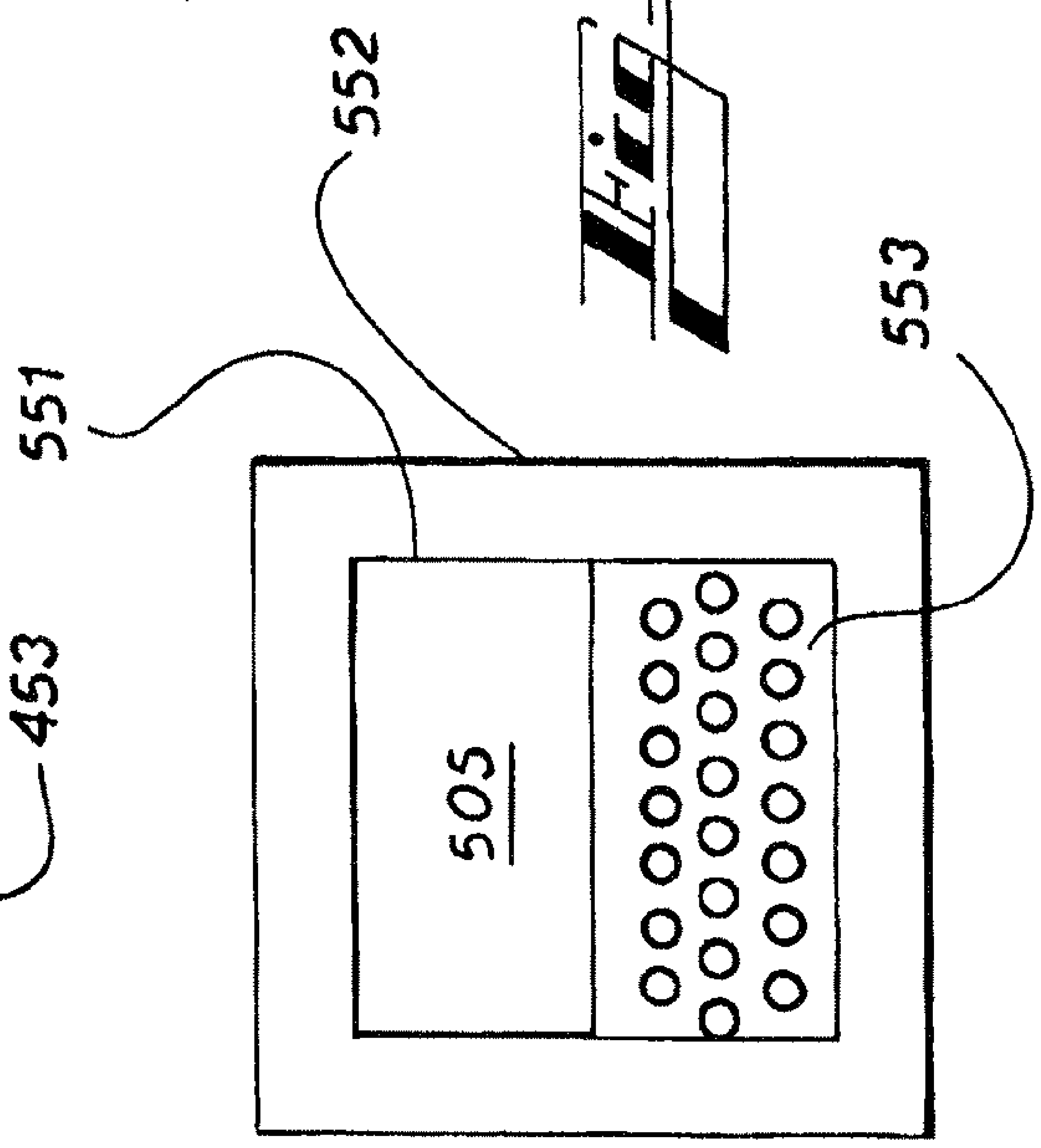

FIG. 5C

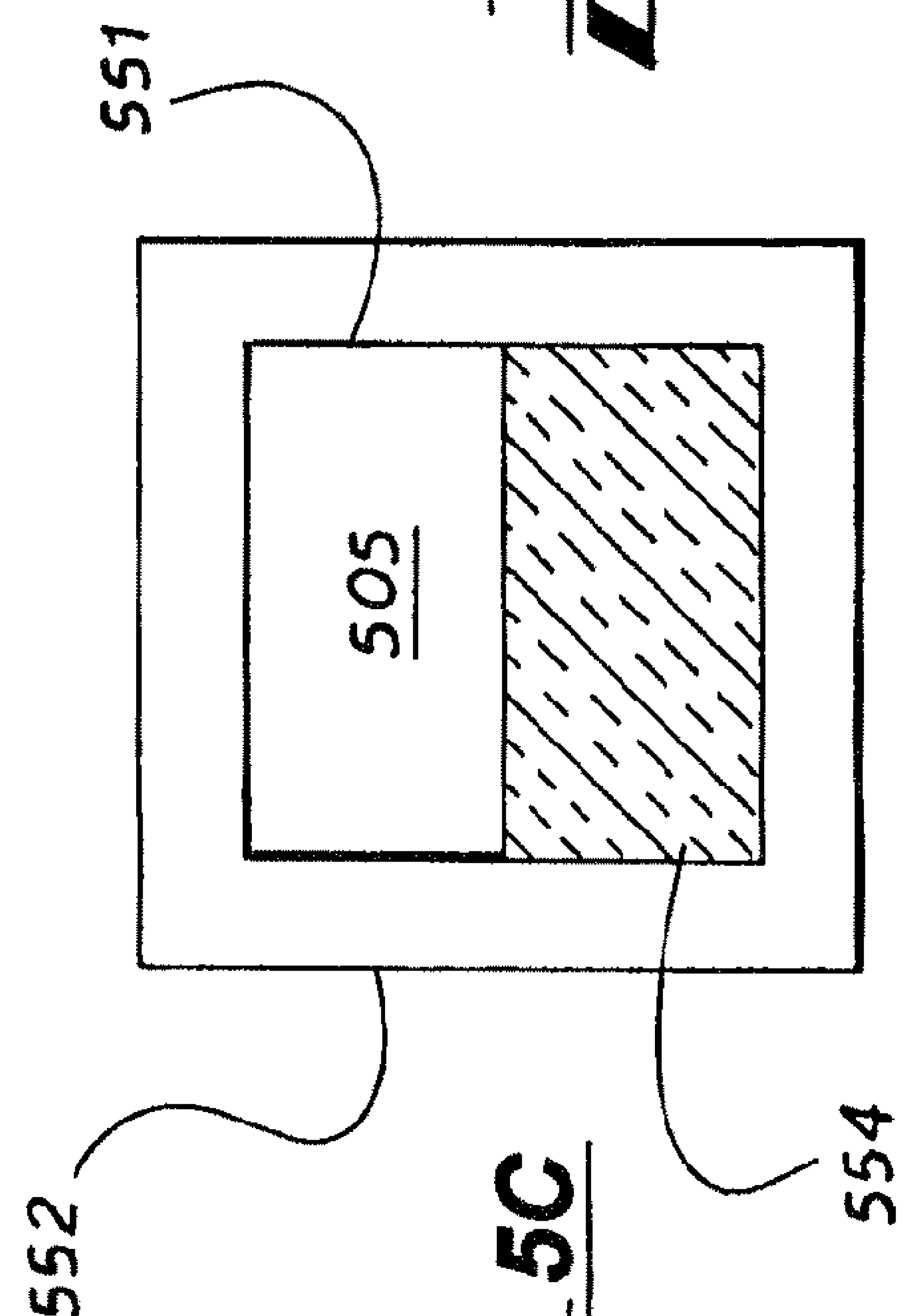

FIG. 5D

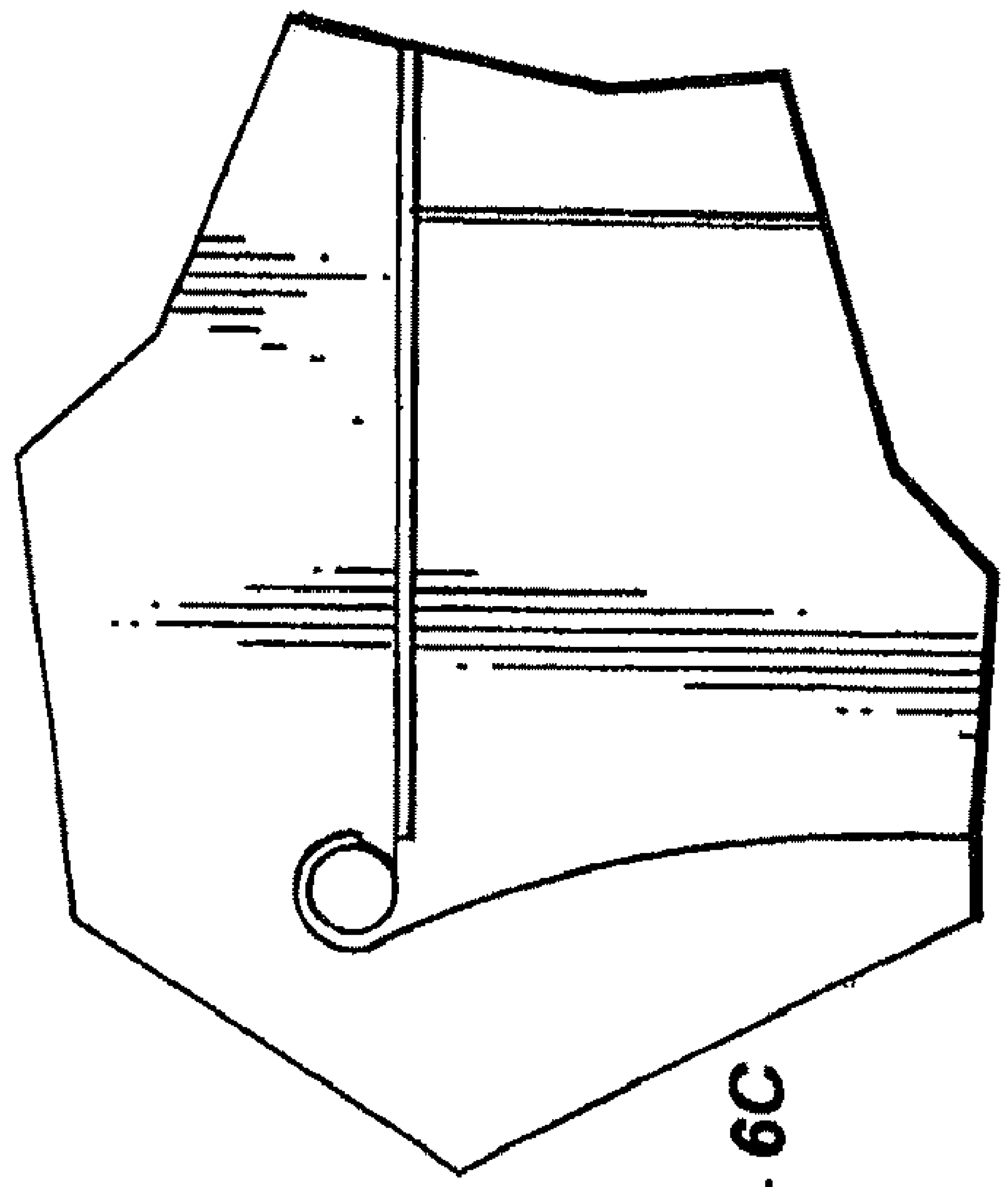

Fig. 6E

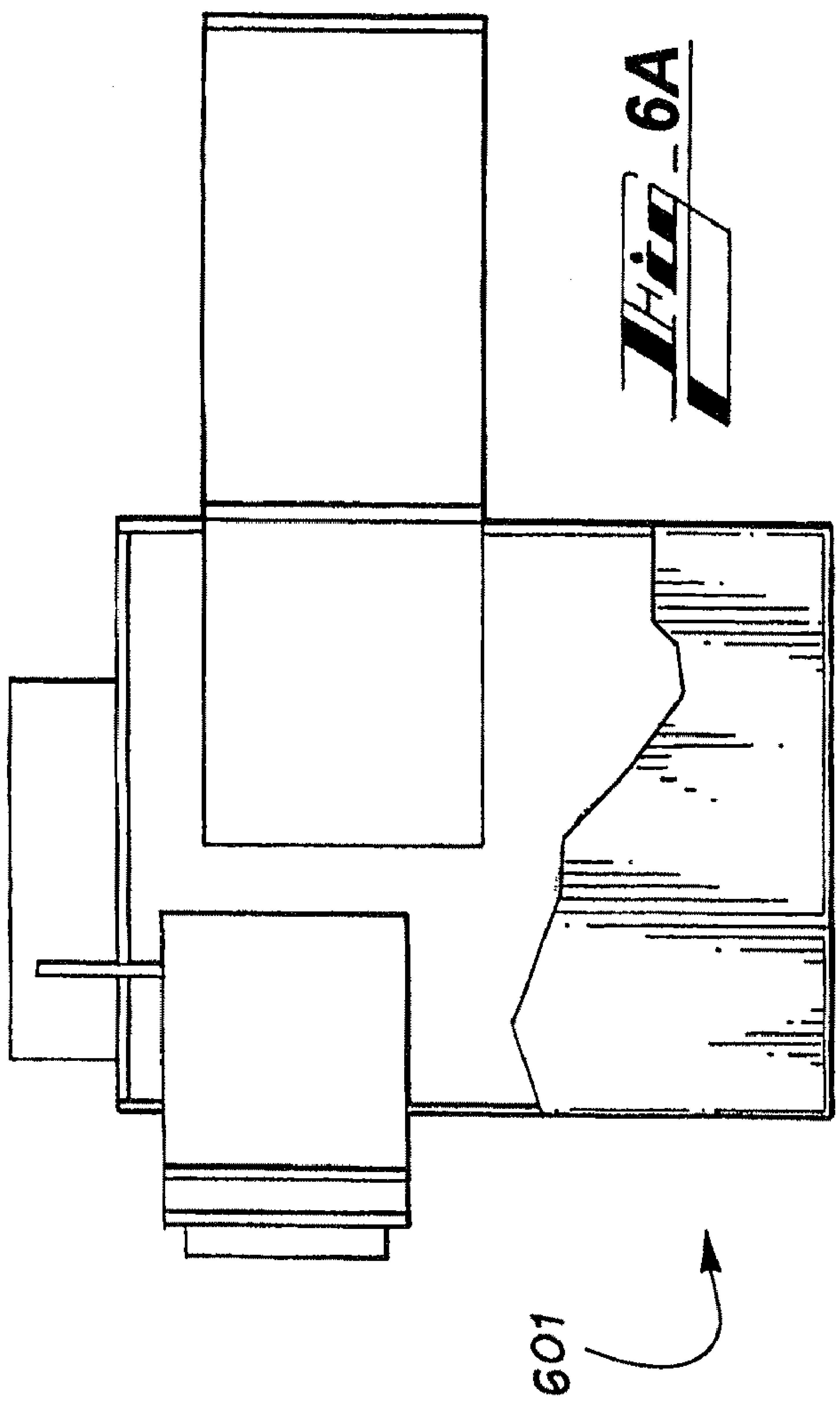

Fig. 6A

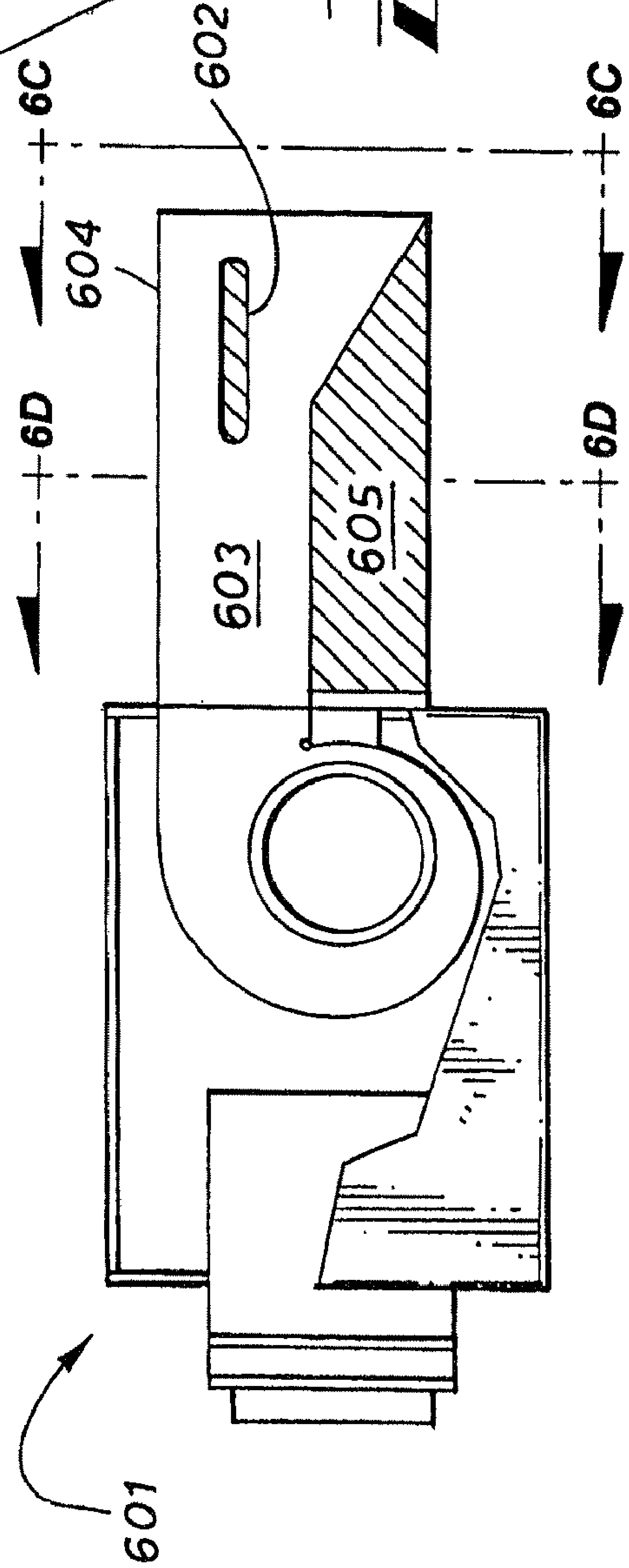

Fig. 6B

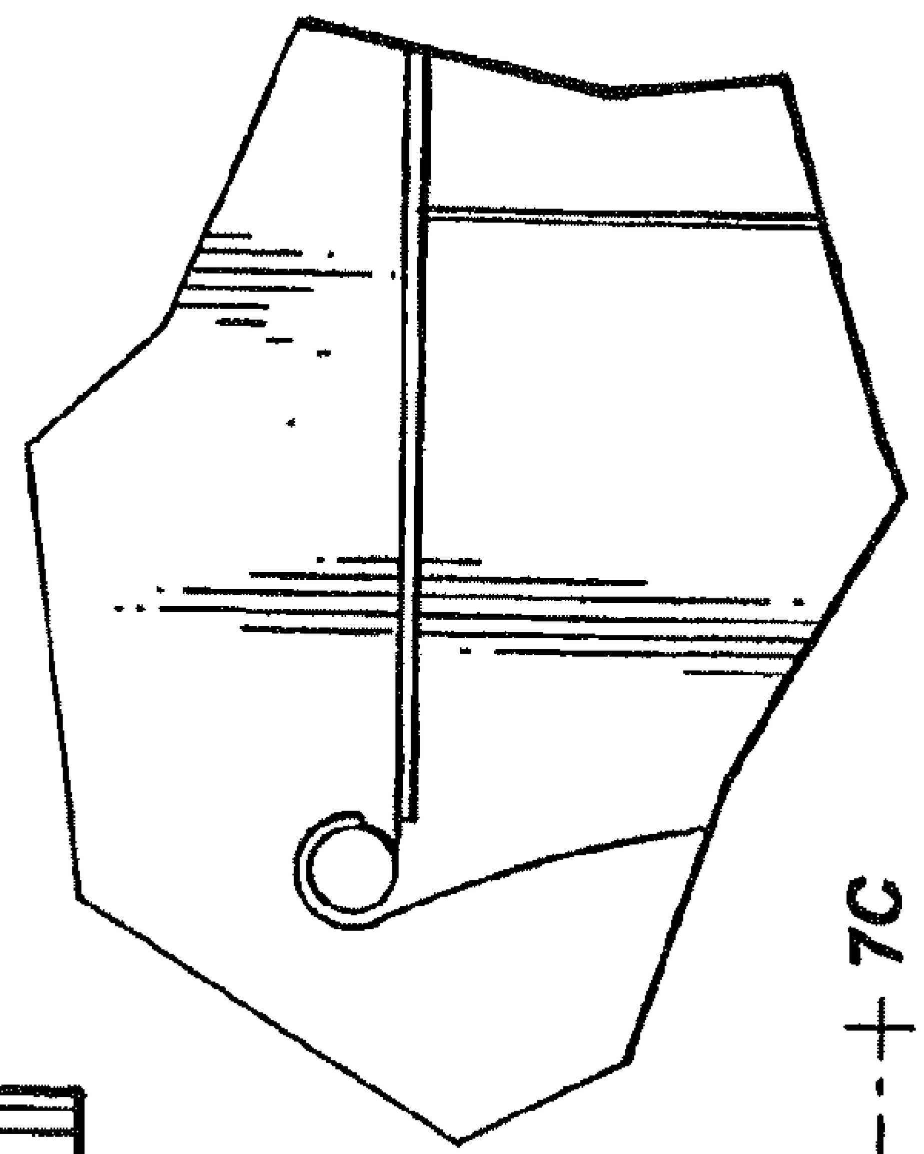

Fig_7E

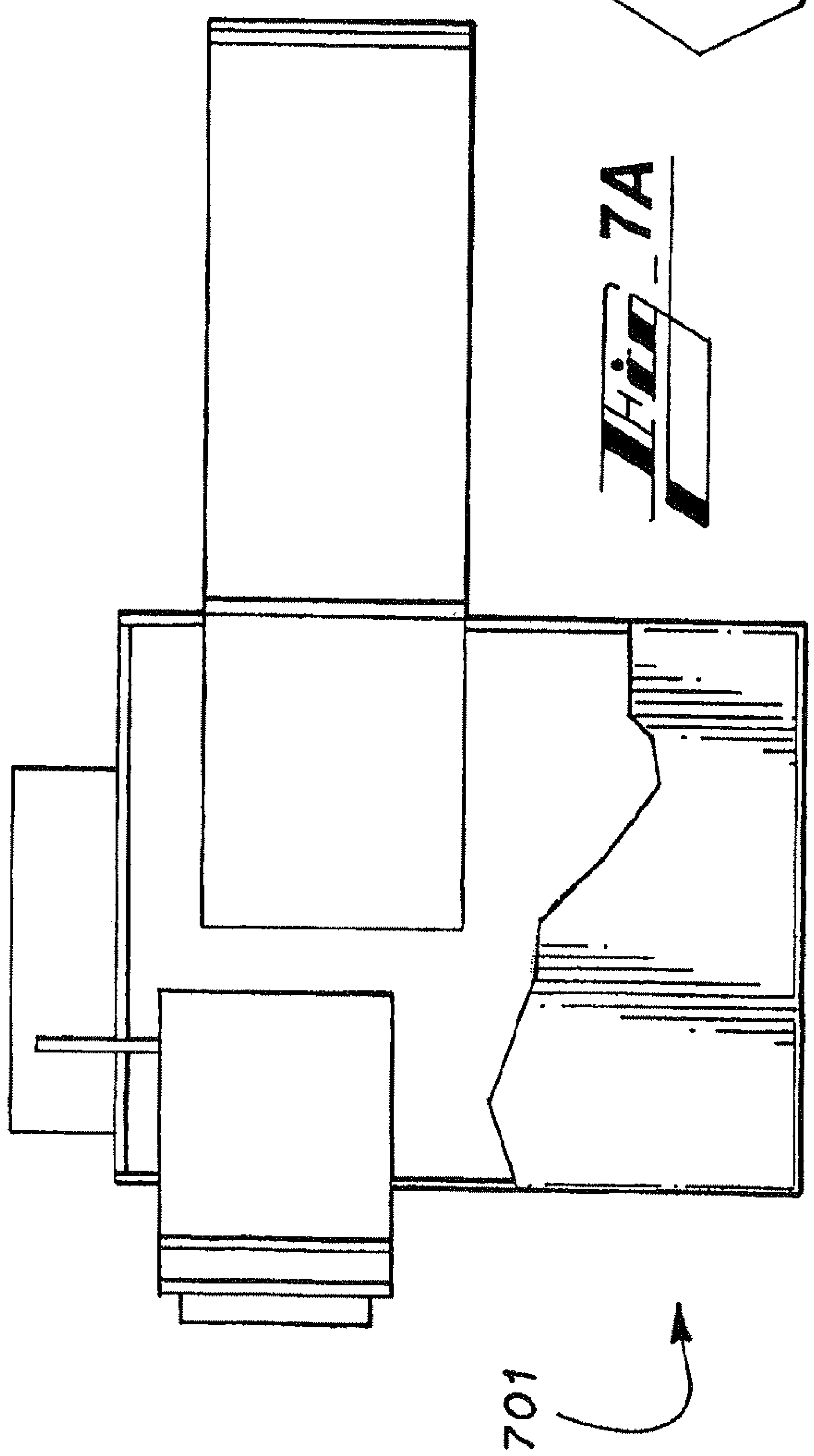

Fig_7A

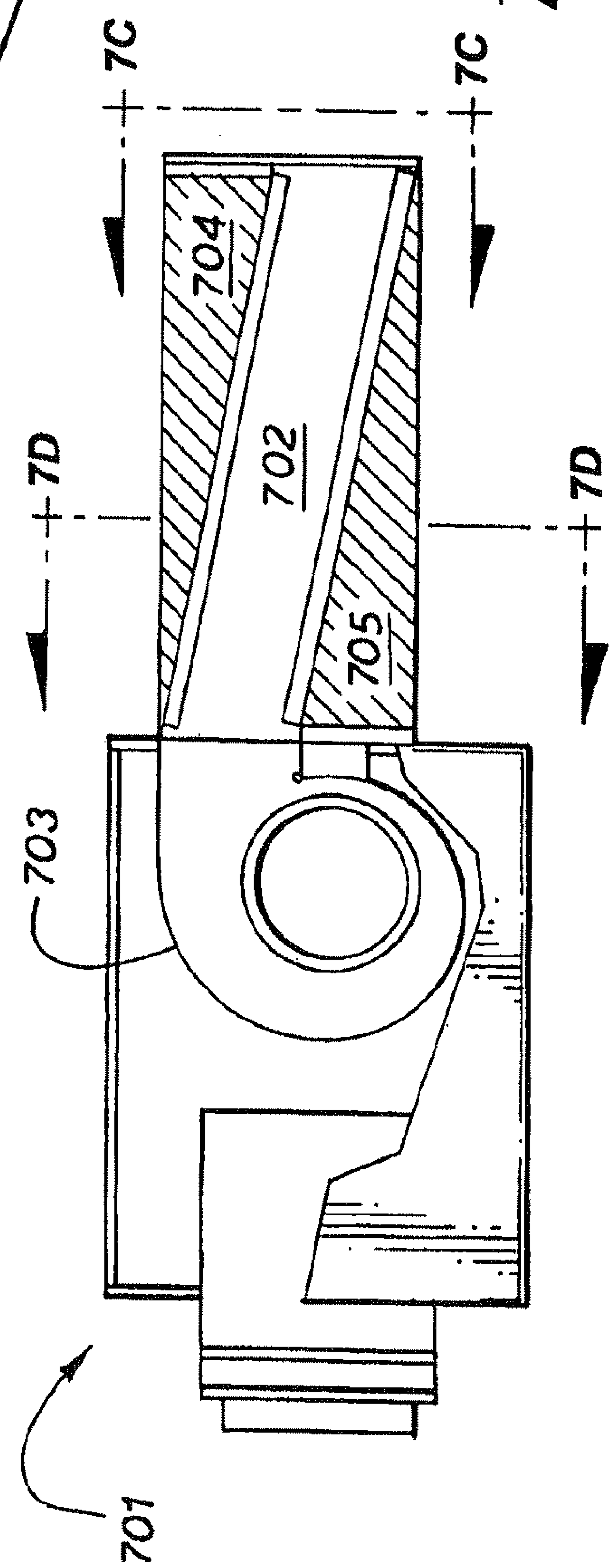

Fig_7B

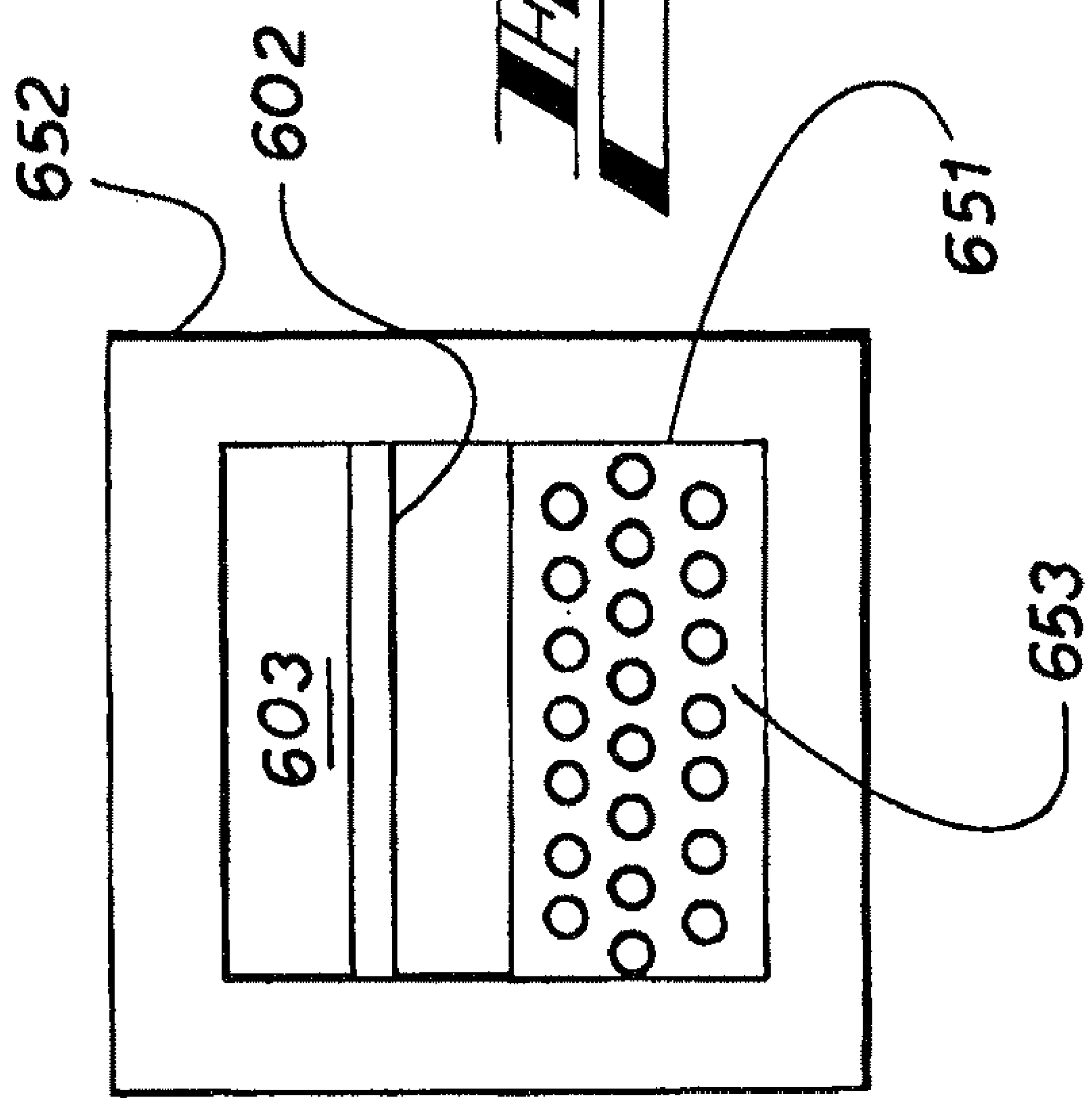

Fig. 6C

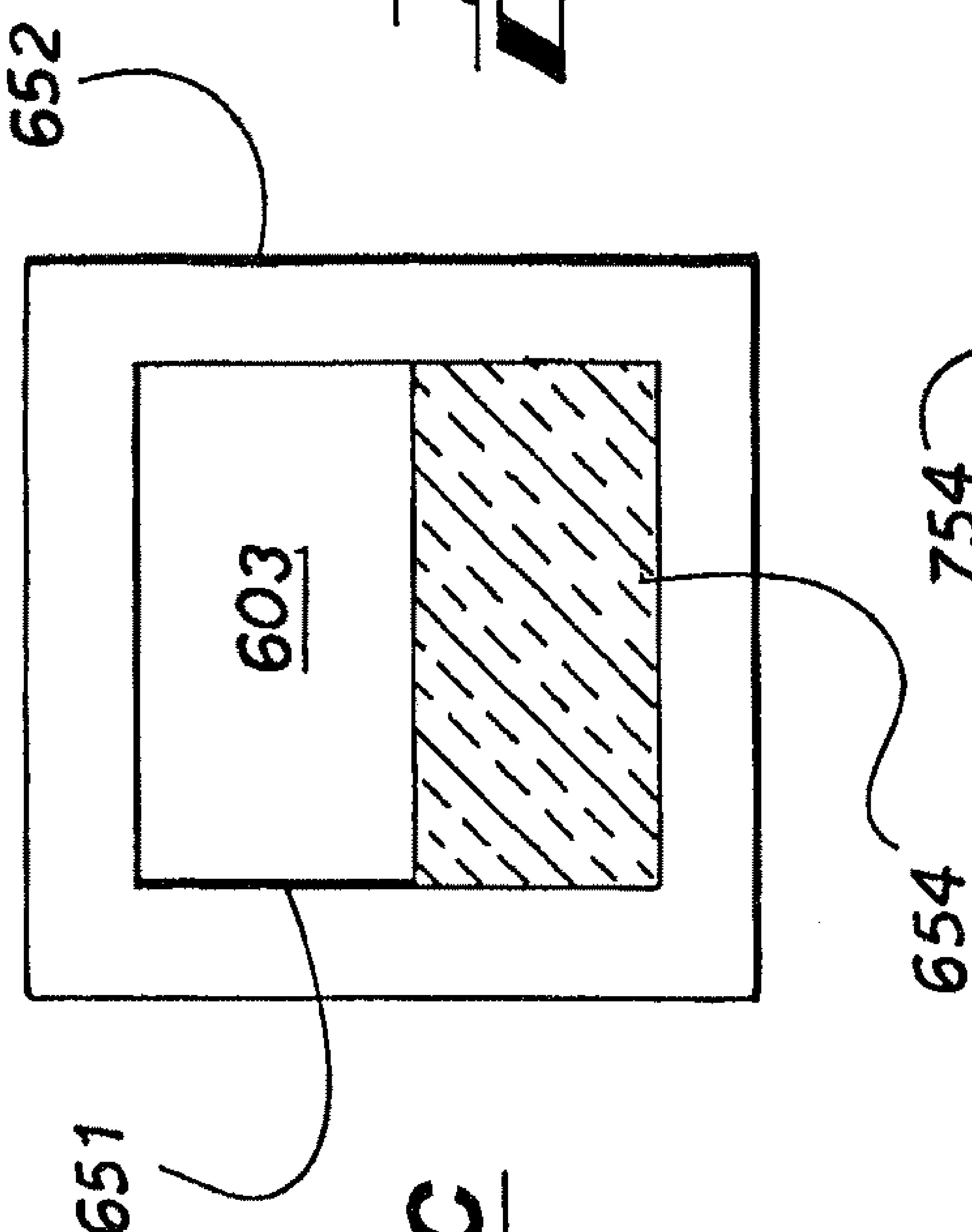

Fig. 6D

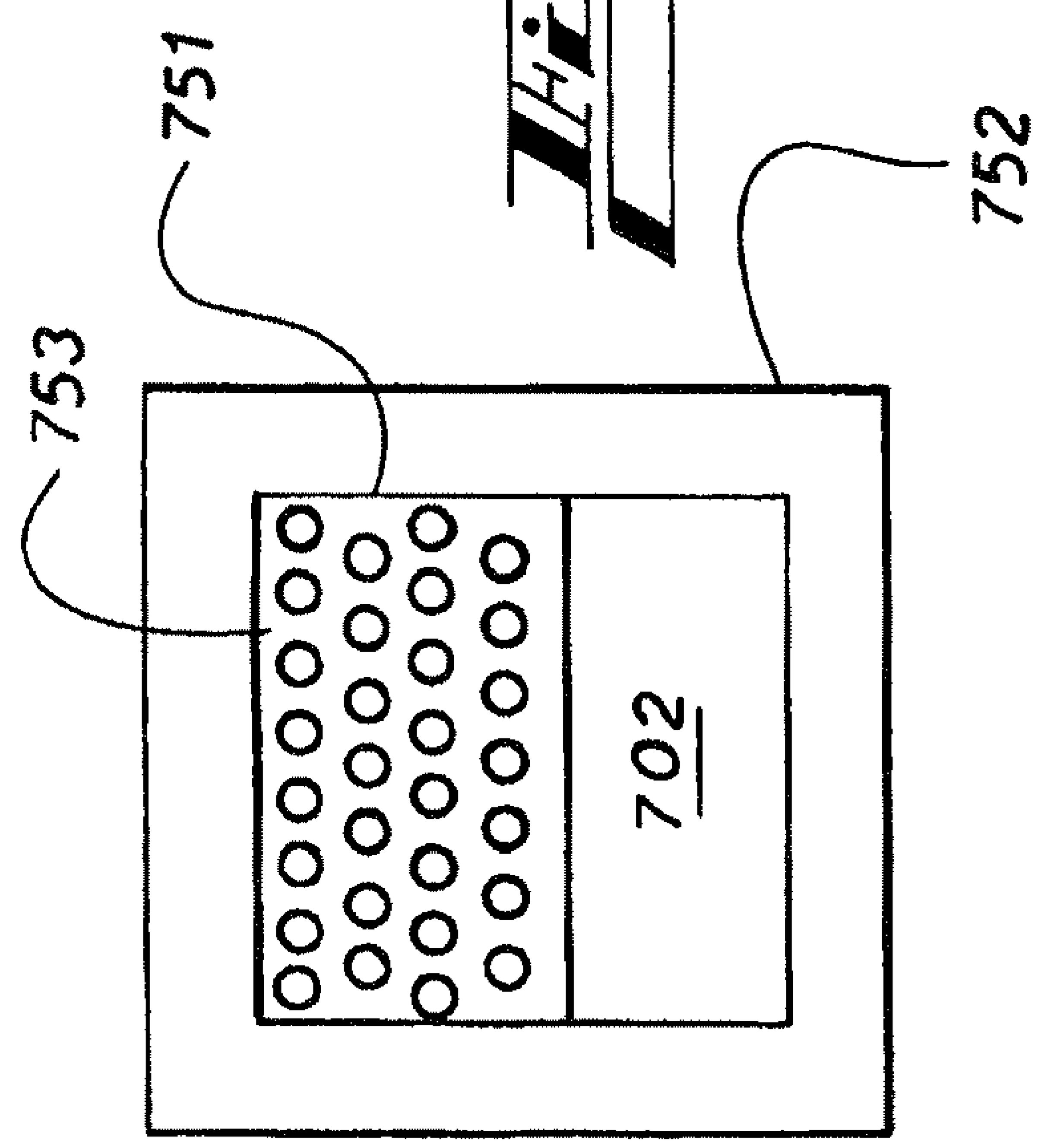

Fig. 7C

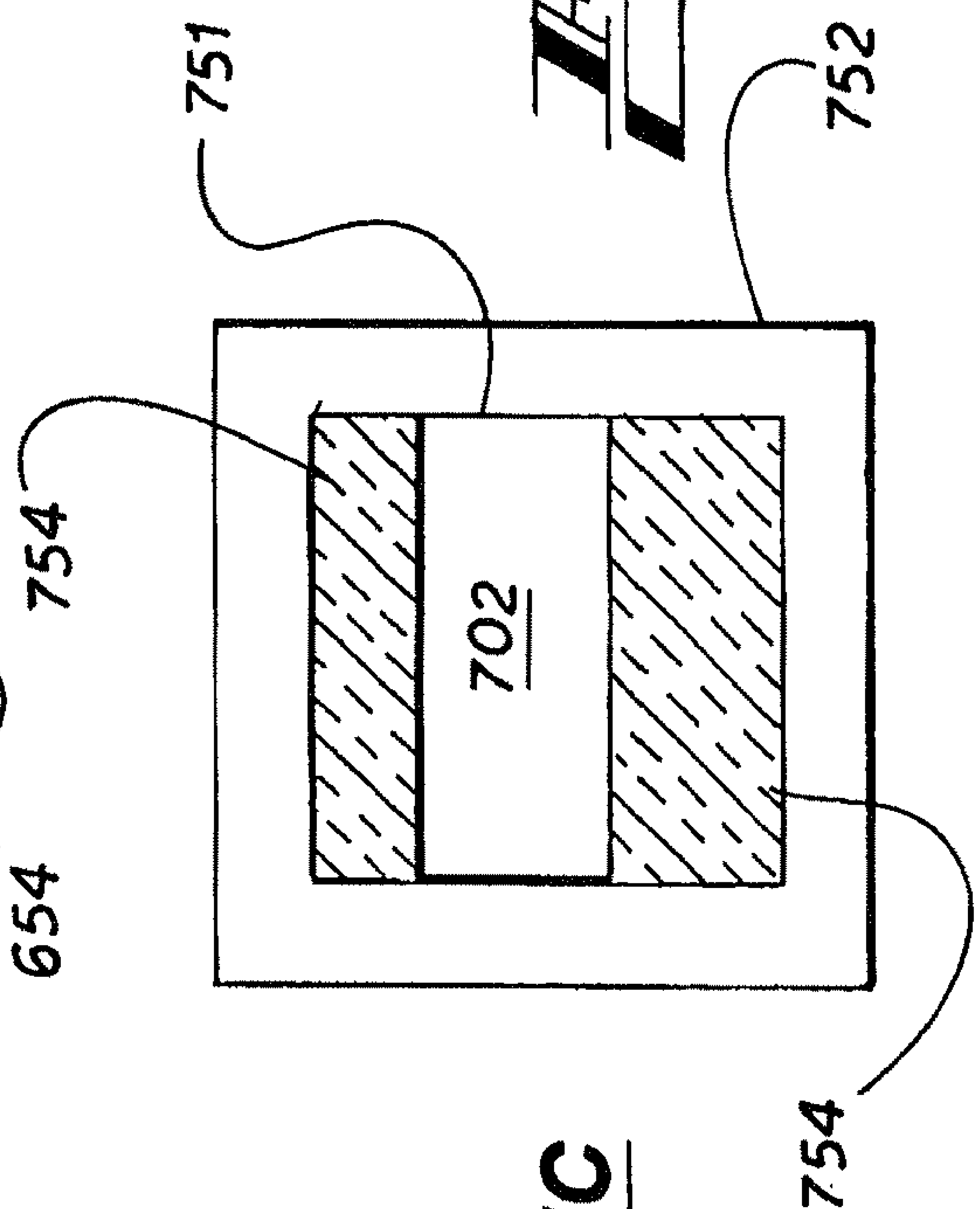

Fig. 7D

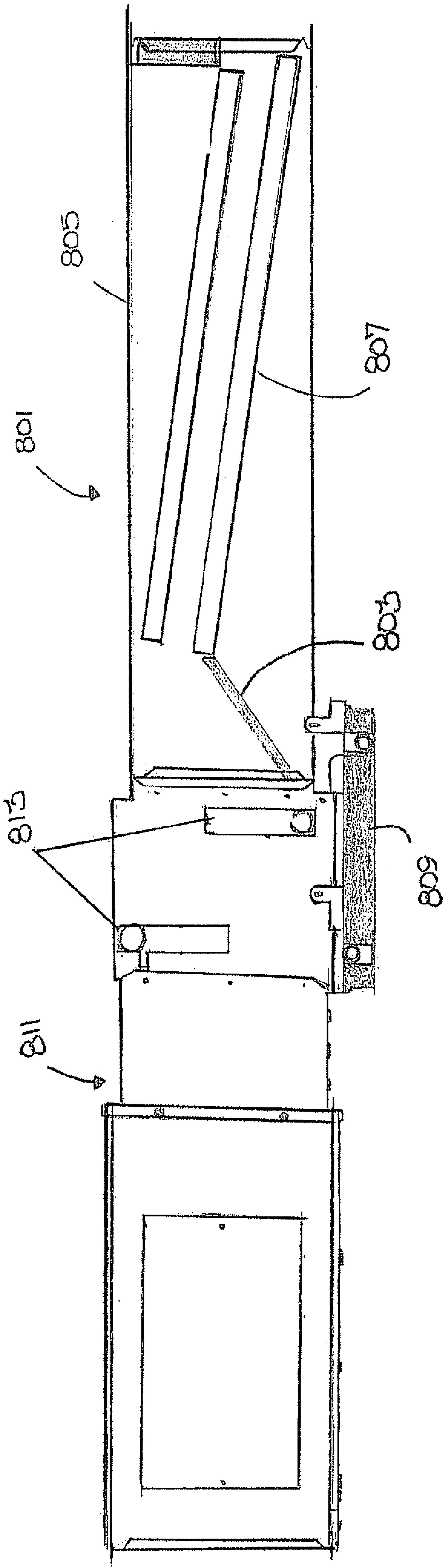

FIG. 8

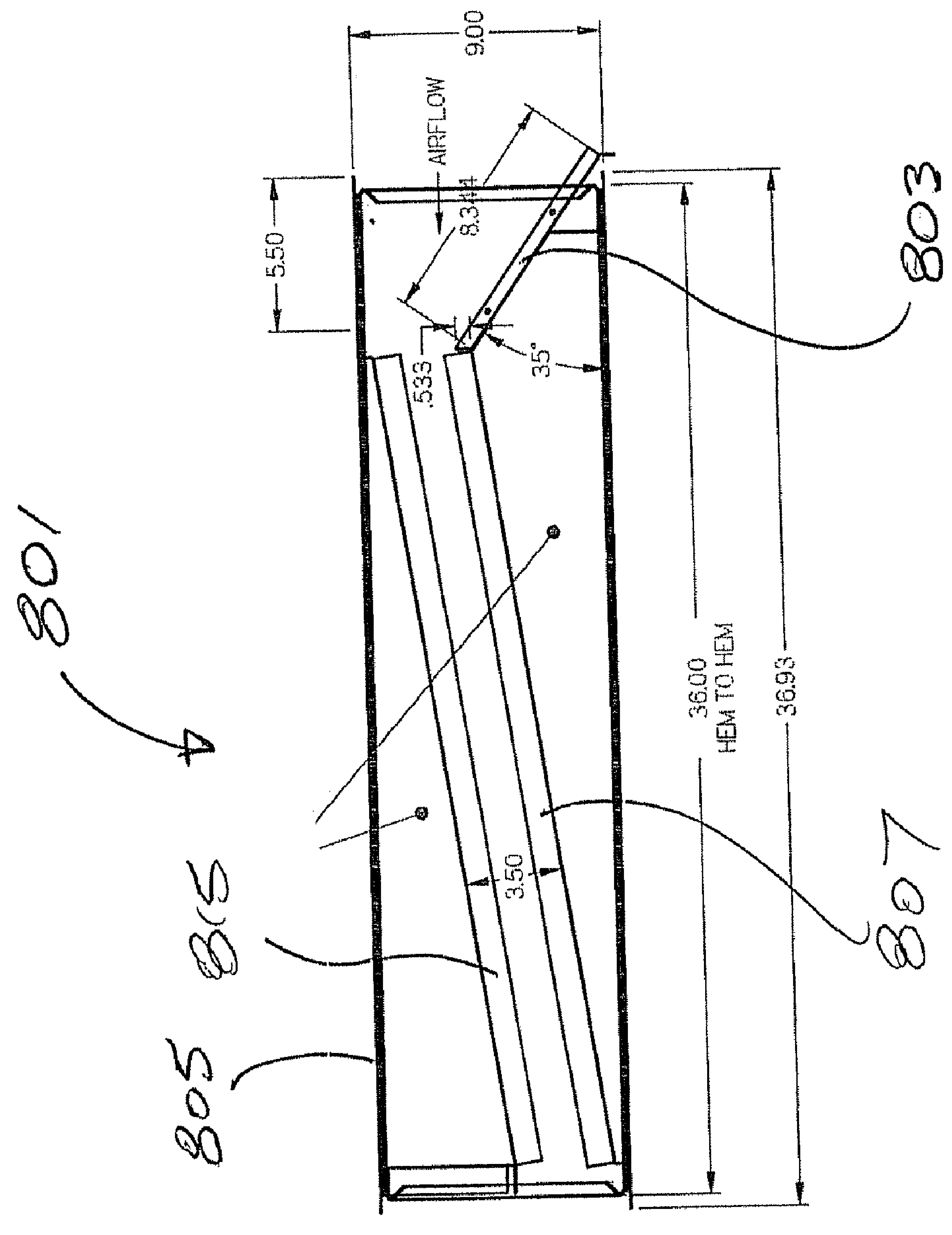
9.00
AIRFLOW
5.50
8.344
803
.533
35°
801
36.00
HEM TO HEM
36.93
807
3.50
805
815

FIG. 9

SOUND ATTENTUATOR

CROSS REFERENCES TO RELATED APPLICATIONS

This application is a continuation-in-part application based on U.S. application Ser. No. 12/047,816, filed Mar. 13, 2008, which claims priority to U.S. provisional application No. 60/895,152, filed Mar. 16, 2007, both of which are incorporated herein by reference.

FIELD OF INVENTION

This invention relates to a silencing unit for HVAC (heating, ventilating, and air conditioning) systems, and more particularly, to a silencer with an integral condensation plate.

BACKGROUND OF THE INVENTION

Commercial HVAC systems may have a contained "Fan Coil" ("FC") for the purpose of providing an outlet for commercial ventilation systems into the rooms of a building or other structure equipped with an HVAC system. An FC typically consists of the following components: 1) centrifugal fan, 2) motor, 3) insulated casing, 4) air inlet (with or without damper), and 5) Heating/Cooling Coils.

In commercial HVAC installations, a "silencer" (or "attenuator") is often attached to the inlet or outlet of an FC in order to attenuate the sound produced by the high-velocity air entering the FC. Such silencers have typically comprised an air duct (typically from three to five feet in length) that is lined internally with insulation to attenuate the noise produced by the air flowing through the FC. Such internal insulation is also known as a "baffle" and is usually held in place by perforated sheet metal. The perforations in the metal allow the air traveling through the silencer to interact with the insulation material contained inside the baffle. The silencer is attached to the inlet or the outlet of the FC and acts to attenuate the noise that is produced by the FC. This attenuation is achieved due to the conversion of acoustic energy into heat energy as the air molecules inside the silencer create friction when they collide with the lined insulation.

The noise generated by an FC or other HVAC component can be separated into two components: 1) noise due to the air disturbance created in the immediate vicinity of the rotating fan blades and 2) aerodynamic noise due to the fan-induced air flow that has variable pressure regions within the fan discharge velocity profile and the air flow interaction with geometry changes in the air stream. The insulation contained in silencers is typically designed to minimize both sources of noise.

There is a need for an improved silencer, particularly one which is compact, efficient and durable.

Fan Coil units are capable of producing condensate carryover when applied in higher humidity conditions. This design helps prevent carryover as an integral part of the unit.

SUMMARY OF THE INVENTION

It is an object of the invention to provide an improved silencer.

The exemplary system described herein (a fan coil quiet unit "FCQ") includes an apparatus and method for attenuating the sound generated by a fan coil unit or other HVAC equipment.

Embodiments of the invention can minimize the noise generated by the variable pressure regions within the FCQ unit by closely coupling the noise-attenuating, insulation-lined silencing portion of the unit to the housing of the centrifugal fan inside the unit. Such close-coupling minimizes the turbulence created by the centrifugal fan and thus minimizes the associated noise.

Embodiments of the invention also minimize noise within the FCQ by creating a constant, uniform cross-sectional profile of the air traveling through the unit. This uniform cross-sectional profile minimizes the turbulence created when air exiting a typical FC enters a silencer with a larger (or smaller) cross-sectional area. The decreased turbulence in the airflow of the invention, in turn, helps minimize the noise generated by the FCQ.

Embodiments of the invention minimize high-frequency noise due to the internal angled or curved geometry of the FCQ. Such geometry obstructs any direct line-of-sight pathway out of the unit that would otherwise allow high-frequency noise to escape without much attenuation. Traditional silencers lack any such internal geometry and instead allow high-frequency noise to exit the silencer without contacting the baffles of the silencer. Therefore, the high-frequency noise in a traditional silencer can escape without much attenuation.

This silencer is described as comprising a casing having an inlet and an outlet; a condensate deflector positioned at the inlet to the casing; at least one baffle being operable to attenuate noise in a gas flowing through the silencer; and an air pathway through the silencer, defined by positions of the condensate deflector and the at least one baffle within the casing. The air pathway is angled or curved to substantially minimize the line-of-sight pathway from the inlet to the outlet. The condensate deflector may also have a leading edge at the inlet to the casing and a trailing edge fixed to a leading edge of the baffle, the trailing edge of the baffle being fixed to the outlet of the casing.

Further objects, features, and advantages will become apparent upon consideration of the following detailed description of the invention when taken in conjunction with the drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevation view of a centrifugal fan and the velocity and pressure profile of the air leaving the centrifugal fan in a prior art FC.

FIG. **2**A is a top cut away view of a prior art FC coupled to a prior art silencer with vertical baffles.

FIG. **2**B is a side cross-sectional view of a prior art FC coupled to a prior art silencer with horizontal baffles.

FIG. **3**A is a top cut away view of a prior art FC coupled to a prior art silencer.

FIG. **3**B is a side cross-sectional view of FIG. **3**A.

FIG. **3**C is an end view along line **3**C of FIG. **3**B.

FIG. **3**D is a cross-sectional view along line **3**D of FIG. **3**B.

FIG. **4**A is a top cut away view of an embodiment of an FCQ in accordance with the invention.

FIG. **4**B is a side cross-sectional view of FIG. **4**A.

FIG. **4**C is an end view along line **4**C of FIG. **4**B.

FIG. **4**D is a cross-sectional view along line **4**D of FIG. **4**B.

FIG. **4**E is a magnified cross-sectional view of inset **4**E of FIG. **4**B.

FIG. **5**A is a top cut away view of an embodiment of an FCQ in accordance with the invention.

FIG. **5**B is a side cross-sectional view of FIG. **5**A.

FIG. **5**C is an end view along line **5**C of FIG. **5**B.

FIG. **5**D is a cross-sectional view along line **5**D of FIG. **5**B.

FIG. **5**E is a magnified cross-sectional view of inset **5**E of FIG. **5**B.

FIG. **6**A is a top cut away view of an embodiment of an FCQ in accordance with the invention.

FIG. **6**B is a side cross-sectional view of FIG. **6**A.

FIG. **6**C is an end view along line **6**C of FIG. **6**B.

FIG. **6**D is a cross-sectional view along line **6**D of FIG. **6**B.

FIG. **6**E is a magnified cross-sectional view of inset **6**E of FIG. **6**B.

FIG. **7**A is a top cut away view of an embodiment of an FCQ in accordance with the invention.

FIG. **7**B is a side cross-sectional view of FIG. **7**A.

FIG. **7**C is an end view along line **7**C of FIG. **7**B.

FIG. **7**D is a cross-sectional view along line **7**D of FIG. **7**B.

FIG. **7**E is a magnified cross-sectional view of inset **7**E of FIG. **7**B.

FIG. **8** presents a side cross-sectional view of a silencer with an integrated condensate diverter in accordance with the invention.

FIG. **9** presents a side cross-sectional view of the silencer of FIG. **8**, including dimensions.

DETAILED DESCRIPTION

FIG. **1** is an illustration of the velocity and pressure profile of a centrifugal fan **101** in a typical prior art FC **100**. The centrifugal fan **101** is enclosed in a housing **103** and blows air out into a discharge duct **102** or attached silencer. The housing **103** of the fan **101** has a cutoff plate **104** on the lower edge of the housing **103**. The cutoff plate **104** creates a low pressure area **105** immediately behind the cutoff plate **104**. The high-velocity air exiting the fan **101** exhibits a non-uniform bulge **106** of high pressure. As the air travels down the discharge duct **102**, the bulge of high pressure will gradually even out as illustrated in **107**, **108**, **109**, and **110**. The turbulence generated as the high pressure bulge gradually evens out will create noise in the FC **100**.

FIGS. **2**A and **2**B are illustrations of the close-coupling of a prior art FC **201** with a prior art silencer **202**. Such silencers typically have vertical baffles **203***a* or horizontal baffles **203***b* (with respect to the FC **201**) in order to attenuate the sound produced by the FC **201**. Prior art silencers **202** typically have a wider cross-sectional area than a corresponding FC **201**, creating a wide area **204** inside the silencer **202**. This wide area **204** creates a space where turbulence can develop in the silencer **202**, thus unnecessarily increasing the noise level in the silencer **202**. In addition, prior art FCs **201** contain the cutoff plate **205** described previously, which also increases the noise generated by the FC **201** due to the non-uniform bulge of high pressure exiting the FC **201**. The cross-sectional area of the blower outlet **210** of prior art FCs **201** is typically larger than the cross-sectional area of the air pathway **206** of prior art silencers **202**. Therefore a "nose" **209** is created where the air exiting the blower outlet **210** collides into the baffles **203***a*, **203***b* inside the silencer **202**. This causes added turbulence and increased noise.

Prior art FCs **201** and silencers **202** also have a direct line-of-sight pathway **206** from the centrifugal fan **207** of the FC **201** to the discharge outlet **208** of the silencer **202**. As a consequence of such a direct line-of-sight pathway **206**, high-frequency sounds can travel relatively unobstructed through the silencer **202**. This is because the shorter wavelengths of high-frequency sound waves produce less displacement of the air molecules and hence those air molecules are less likely to collide with the baffles **203***a*, **203***b* inside the silencer **202**. This "beaming" effect of high-frequency sounds thus reduces the effectiveness of prior art silencers **202** in reducing high-frequency noise.

FIGS. **3**A-**3**D are depictions of a prior art FC **301** closely-coupled to a prior art silencer **304** with only a half-baffle design. That is, the silencer **304** contains a baffle **306** on only a single internal wall. This half-baffle silencer **304** still contains a nose **302** which leads to increased turbulence and noise. The nose **302** is caused because the cross-sectional air pathway **305** of the silencer **304** is narrower than the cross-sectional area of the blower outlet **303** of the FC **301**.

FIG. **3**C depicts an end view of the silencer **304** and the perforated metal casing **353** that encloses the insulating material **354** of the baffle **306**. FIG. **3**C also shows the casing **351** of the silencer **304** and the casing **352** of the FC **301**.

FIG. **3**D depicts a cross-sectional view of the insulating material **354** that comprises the baffle **306** of the silencer **304**. FIG. **3**D also shows the casing **351** of the silencer **304** and the casing **352** of the FC **301**.

FIGS. **4**A-**4**E depict an embodiment of an FCQ **401** in accordance with the invention. FCQ **401** contains a silencer inlet extension **402** which connects the top edge **403** of the baffle **409** contained in the silencing portion **404** of the FCQ **401** directly to the cutoff plate **405** of the centrifugal fan **406** housed in the FCQ **401**. The silencer inlet extension **402** eliminates the low-pressure area **105** caused by the cutoff plate **104** in prior art FCs (FIG. **1**). Therefore, the air exiting the centrifugal fan **406** does not contain a non-uniform bulge of high pressure as it travels down the air pathway **407** of the silencing portion **404** of the FCQ **401**.

In addition, the cross-sectional area of the blower outlet **408** substantially equals the cross-sectional area of the air pathway **407** of the silencing portion **404** of the FCQ **401**. Therefore, the FCQ **401** contains no nose, unlike the nose **209**, **302** present in prior art silencers **202**, **304** (FIGS. **2**B, **3**B).

FIG. **4**C depicts an end view of the FCQ **401** and the perforated metal casing **453** that encloses the insulating material **454** of the baffle **409**. FIG. **4**C also shows the casing **451** of the silencing portion **404** of the FCQ **401** and the casing **452** of the plenum portion of the FCQ **401**.

FIG. **4**D depicts a cross-sectional view of the insulating material **454** that comprises the baffle **409** of the silencing portion **404** of the FCQ **401**. FIG. **4**D also shows the casing **451** of the silencing portion **404** of the FCQ **401** and the casing **452** of the plenum portion of the FCQ **401**.

FIGS. **5**A-**5**E illustrate an embodiment of the invention wherein the baffle **502** of the silencing portion **503** of the FCQ **501** flares outward in a "tail" **504**. This tail **504** allows the expanding air that is traveling down the air pathway **505** to maintain a constant pressure. This is because the increased cross-sectional area of the tail portion **504** of the FCQ **501** provides additional space for the expanding air to occupy, thus preventing a buildup of pressure within the FCQ **501**.

FIG. **5**C depicts an end view of the FCQ **501** and the perforated metal casing **553** that encloses the insulating material **554** of the baffle **502**. FIG. **5**C also shows the casing **551** of the silencing portion **503** of the FCQ **501** and the casing **552** of the plenum portion of the FCQ **501**.

FIG. **5**D depicts a cross-sectional view of the insulating material **554** that comprises the baffle **502** of the silencing portion **503** of the FCQ **501**. FIG. **5**D also shows the casing **551** of the silencing portion **503** of the FCQ **501** and the casing **552** of the plenum portion of the FCQ **501**.

FIGS. **6**A-**6**E illustrate an embodiment of the invention with a high-frequency splitter **602** placed in the air pathway **603** of the FCQ **601**. The high-frequency splitter **602** scatters high-frequency sound waves that would otherwise pass relatively unobstructed through the air pathway **603** due to the "beaming" effect of high-frequency sound. The scattered high-frequency sound waves will therefore tend to impact the baffle **605** directly or bounce off the casing **604** and then into the baffle **605**, which will attenuate the sound.

FIG. **6**C depicts an end view of the FCQ **601** and the perforated metal casing **653** that encloses the insulating material **654** of the baffle **605**. FIG. **6**C also shows an end view of the high-frequency splitter **602**. FIG. **6**C also shows the casing **651** of the silencing portion of the FCQ **601** and the casing **652** of the plenum portion of the FCQ **601**.

FIG. **6**D depicts a cross-sectional view of the insulating material **654** that comprises the baffle **605** of the silencing portion of the FCQ **601**. FIG. **6**D also shows the casing **651** of the silencing portion of the FCQ **601** and the casing **652** of the plenum portion of the FCQ **601**.

FIGS. **7**A-**7**E depict an embodiment of the invention wherein the air pathway **702** of the FCQ **701** is angled or curved, thus minimizing or eliminating the line-of-sight pathway from the centrifugal fan **703** to the discharge outlet of the FCQ **701**. This elimination of the line-of-sight pathway will likewise minimize the high-frequency noise emitted by the centrifugal fan **703** and prevent high-frequency sound waves from traveling down the air pathway **702** unobstructed. The silencing portion of the FCQ **701** can be up to five feet in length, or as little as three feet or less, depending on the application and design parameters.

FIG. **7**C depicts an end view of the FCQ **701** and the perforated metal casing **753** that encloses the insulating material **754** of the angled top baffle **704**. FIG. **7**C also shows the casing **751** of the silencing portion of the FCQ **701** and the casing **752** of the plenum portion of the FCQ **701**.

FIG. **7**D depicts a cross-sectional view of the insulating material **754** that comprises the top and bottom baffles **704**, **705** of the silencing portion of the FCQ **701**. FIG. **7**D also shows the casing **751** of the silencing portion of the FCQ **701** and the casing **752** of the plenum portion of the FCQ **701**.

FIGS. **8** and **9** depict an additional embodiment of a silencer **801** based on that of FIG. **7**, except that it further includes an integrated condensate diverter **803** at the inlet to the silencer **801** rather than a rounded nosing or endplate on the baffle **807**. Because the inlet to this silencer **801** has no blunt obstructions, it can efficiently mate with any HVAC component having standard dimensions. It does not have to be designed, for example to mate with the outlet of a single centrifugal fan as shown in FIG. **7**B but could mate with a fan coil unit having two or more fans, an axial fan, etc.

The construction details for this silencer **801** will depend on the application and environment in which the system is being installed. For example, in a standard commercial application the casing **805** may be galvanized sheet metal. In such an installation the condensate diverter **803** will typically also be of galvanized sheet metal without perforations, riveted to the silencer walls, the joints being sealed with commercial sealant. The trailing edge of the condensate diverter **803** meets the leading edge of the perforated sheet metal making the lower baffle **807**. The condensate diverter **803** may be fastened to the lower baffle **807**, but it is generally sufficient to have a folded joint. The trailing edge of the lower baffle **807** terminates adjacent to the outlet of the silencer **801**, being fastened to the floor of the silencer **801** with rivets, sheet metal screws, tack-welds or other similar fastening systems.

In FIG. **8** the silencer **801** is shown connected to a fan coil assembly **811**, which includes coils **813** and a drip pan **809** to collect condensate from the coils **813**. The leading edge of the condensate diverter **803** may protrude from the front of the silencer **801** as shown in both FIG. **8** and FIG. **9** so that condensation dripping down from the condensate diverter **803** is diverted back to the drain slots in the water coil, to the existing drip pan **809**. Alternatively, one could design the condensate diverter **803** to be entirely enclosed by the silencer **801** and provide a separate drip pan below the condensate diverter **803**.

Exemplary dimensions for this silencer embodiment are shown in FIG. **9**. Specifically, this embodiment is shown for a standard 36"L×21"W×9"H duct. The condensate diverter **803** is 8.344" long and is oriented at an angle of 35° to the lower panel of the casing **805**. The lower baffle **807** and upper baffle **815** are parallel to one another and spaced apart by 3.5". The lower baffle **807** and upper baffle **815** are typically fabricated from perforated sheet metal or wire mesh, and are filled with sound-absorbing media. The type of media used, the density and binding agents will depend on the customer's specifications, building codes and the application and may include for example, matted or randomly arranged fibreglass or rockwool insulation. Such design parameters are known in the art.

The angle of the nosing and the length were optimized during design and testing to ensure that the condensation carryover would be effectively reduced without creating too much pressure drop. By increasing the length of the condensate diverter **803** one could effectively catch more condensate carryover but the length of the silencer would be increased. In the application of FIG. **9** it was necessary to keep the entire length less than 36" so sound testing was performed to optimize the design.

The diagonal orientation of the baffles **807**, **815** provides a longer path for sound to travel along the baffle surfaces for a given a silencer length, resulting in greater sound reduction for a given silencer length. Increasing the gap between the baffles **807**, **815** will result in lower losses, though it will result in less noise reduction. In the embodiment of FIG. **9** there is no line-of-sight path through the silencer when the leading edge of the lower baffle **807** is higher than the trailing edge of the upper baffle **815**. Increasing the degree of overlap between the leading edge of the lower baffle **807** and the trailing edge of the upper baffle **815** when viewed from the inlet of the silencer will also increase the degree of noise reduction.

In this particular embodiment, integrating the silencer baffles **807**, **815** and condensate diverter **803** allowed the combined unit to be reduced in length by 8". Reducing the length saves material, and also allows a silencer and condensate diverter to be installed in a tighter location. If space constraints forced one to go without a condensate diverter then downstream components could deteriorate due to rust and mold, and air quality would suffer.

Integrating the non-line-of-sight concept with the flat, condensate diverter nosing, effectively reduced the noise levels as well as reducing the amount of condensate carryover. Sound power levels of fan coil units were reduced as was condensate carryover, without reducing flow performance.

Silencers for fan coil units are available on the market but they do not offer integral condensate diverting sections. There are condensate diverting sections which are occasionally used in the industry but these are only available separate from the silencer. Typically, the trailing edge of commercially available condensate diverting sections do not line up at all with the leading edge of commercial silencers, so there is a great deal of turbulence and resulting air flow losses. Even if the two components did mate effectively, this would result in a longer component than the integral design of the invention, and it would not provide an optimized solution. That is, the integral design can be tested in a lab and optimized for design parameters. In contrast, combining separate silencer and condensate diverter sections that have been optimized independently will not yield the same performance.

While this invention has been described with reference to the structures and processed disclosed, it is to be understood that variations and modifications can be affected within the spirit and scope of the invention as described herein and as described in the appended claims.

What is claimed is:

1. A silencer comprising:

a casing having an inlet and an outlet;

a condensate deflector plate positioned at the inlet to said casing;

at least one baffle being operable to attenuate noise in a gas flowing through said silencer;

an air pathway through said silencer, defined by positions of said condensate deflector plate and said at least one baffle within said casing, the air pathway being angled or curved to substantially minimize the line-of-sight pathway from said inlet to said outlet.

2. The silencer of claim **1** wherein said condensate deflector plate has a leading edge at the inlet to said casing and a trailing edge fixed to a leading edge of one of said at least one baffles, the trailing edge of said one of said at least one baffles being fixed to the outlet of said casing.

3. The silencer of claim **2** comprising two baffles.

4. The silencer of claim **3** wherein said two baffles are straight, spaced-apart and are substantially parallel to one another.

5. The silencer of claim **3** wherein said two baffles define a uniform cross-section along the length of said baffles, for said air pathway.

6. The silencer of claim **4** wherein said two baffles are disposed within said casing in a diagonal orientation with respect to the top and bottom sides of said casing.

7. The silencer of claim **6** wherein said baffles comprise sound-absorbing media and perforated metal sheet.

8. The silencer of claim **1** wherein said casing is five feet or less in length.

9. The silencer of claim **1** wherein said condensate deflector plate comprises a substantially flat, rigid material.

10. The silencer of claim **1** wherein the leading edge of said condensate deflector plate is oriented to project beyond the leading edge of said casing, whereby condensation is directed to a drip pan outside said casing.

11. The silencer of claim **1** further comprising a drip pan to catch condensation from said condensate deflector plate.

12. The silencer of claim **6** wherein the leading edge of the lower baffle is higher than the trailing edge of the upper baffle.

13. A fan coil unit comprising:

a centrifugal fan;

a housing comprising a cutoff plate and a blower outlet and containing said centrifugal fan;

a first casing comprising a plenum and said housing, said first casing containing an inlet and an outlet;

a second casing comprising a silencing portion and containing at least one baffle, said second casing containing an inlet and an outlet;

wherein said blower outlet is connected to the outlet of said first casing;

wherein the outlet of said first casing is directly coupled to the inlet of said second casing;

wherein said silencing portion comprises:

a condensate deflector plate positioned at the inlet;

at least one baffle being operable to attenuate noise in a gas flowing through said silencer;

an air pathway through said silencer, defined by positions of said condensate deflector plate and said at least one baffle within said casing, the air pathway being angled or curved to substantially minimize the line-of-sight pathway from said inlet to said outlet.

14. The fan coil unit of claim **13** wherein said condensate deflector plate has a leading edge at the inlet to said second casing and a trailing edge fixed to a leading edge of one of said at least one baffles, the trailing edge of said one of said at least one baffles being fixed to the outlet of said second casing.

15. The fan coil unit of claim **14** comprising two baffles.

16. The fan coil unit of claim **15** wherein said two baffles are straight, spaced-apart and are substantially parallel to one another.

17. The fan coil unit of claim **15** wherein said two baffles define a uniform cross-section for said air pathway.

18. The fan coil unit of claim **16** wherein said two baffles are disposed within said second casing in a diagonal orientation with respect to the top and bottom sides of said second casing.

19. The fan coil unit of claim **18** wherein said baffles comprise sound-absorbing insulation and perforated metal sheet.

20. The fan coil unit of claim **19** wherein the leading edge of the lower baffle is higher than the trailing edge of the upper baffle.

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